

THE INDUSTRY'S RECOGNIZED AUTHORITY

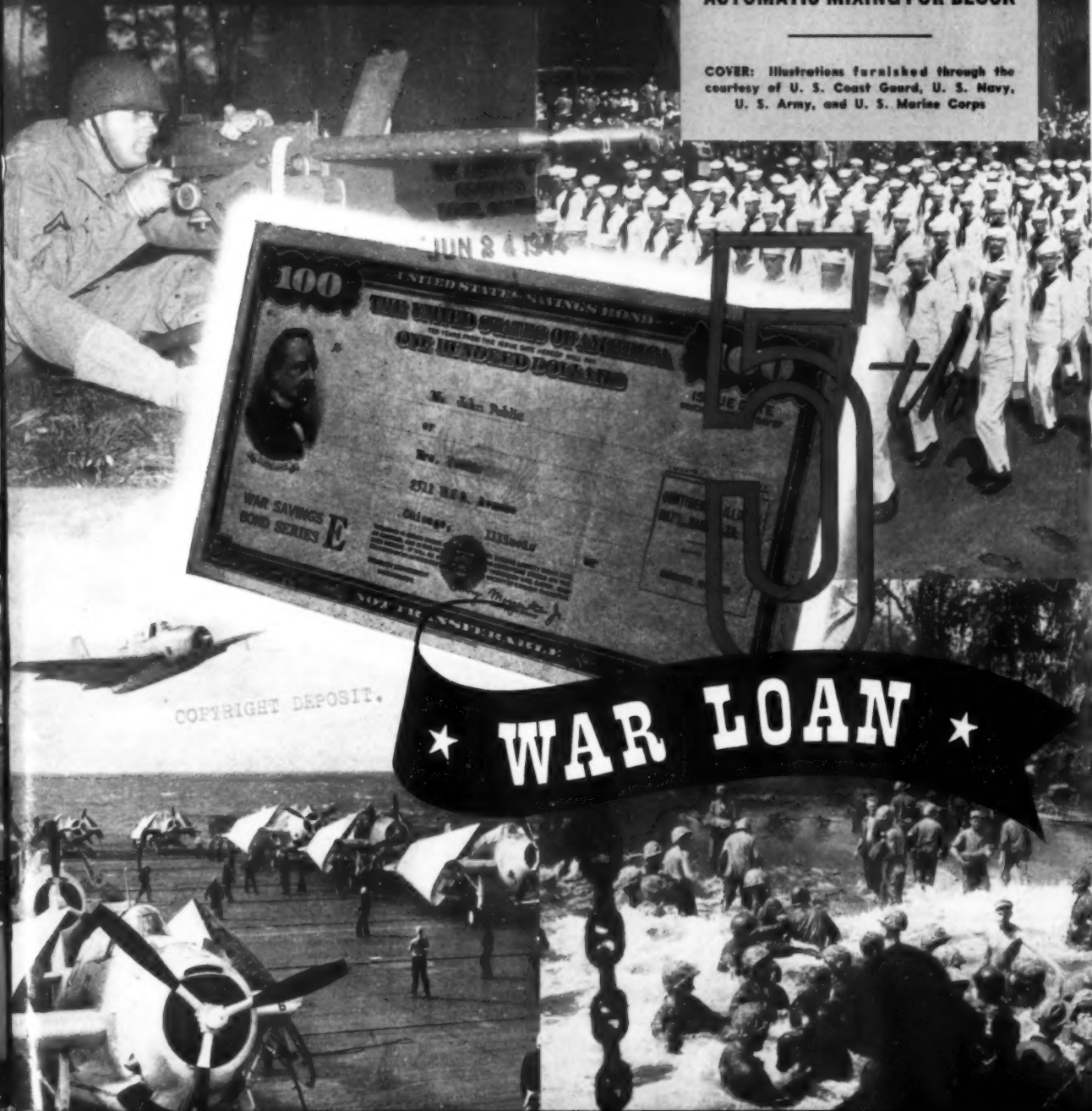
ROCK PRODUCTS

CEMENT • SAND AND GRAVEL • CRUSHED STONE • LIME • GYPSUM
READY-MIXED CONCRETE • CONCRETE PRODUCTS • INDUSTRIAL MINERALS

JUNE
1944

MAKE LIME IN CEMENT KILNS
EFFECTS OF SEGREGATION
LIMESTONE DUST FOR MINES
READY MIX FOR AIRPORTS
AUTOMATIC MIXING FOR BLOCK

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★ WAR LOAN ★

JUN 23 1944

PORTER DIESEL-ELECTRIC Switchers

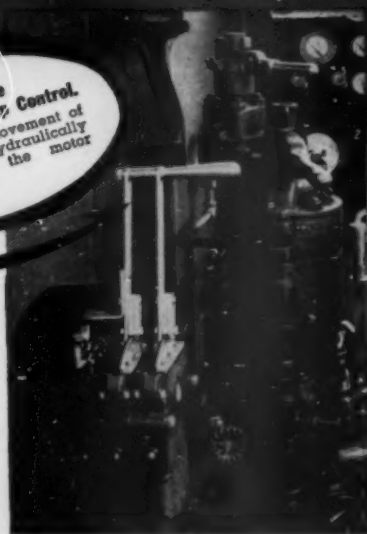


and now

FINGER-TIP CONTROL

- POSITIVE
- ACCURATE
- INSTANTANEOUS

This is the
PORTER Finger-Tip Control.
The slightest movement of
the throttle is hydraulically
transmitted to the motor
speed control.



To the progressive refinements constantly being incorporated in PORTER Diesel-Electric Switchers we now add FINGER-TIP CONTROL.

Utilizing the hydraulic principle of transmitting motion, PORTER'S Finger-Tip Control assures accurate synchronization of motors, and positive, instantaneous response to the slightest movement of the throttle lever in the cab. Finger-Tip Control eliminates troublesome rods, cables, pulleys, and turnbuckles, with their tendency to lost motion, back lash, and need for constant adjustment. Complete description and photographs on request.

LOCOMOTIVE DIVISION:

Diesel, Diesel-Electric, Electric, Steam, and Fireless Steam Locomotives.

PROCESS EQUIPMENT DIVISION:

Agitators, Mixers, Blenders, Ball and Pebble Mills, Autoclaves, Driers, Digesters, Condensers, Evaporators, Fractionating Columns, Heat Exchangers, Pressure Vessels, Tanks, Vulcanizers, Jacketed Fittings.

QUIMBY PUMP DIVISION:

Screw, Rotor, Centrifugal, Chemical Pumps.

ORDNANCE DIVISION:

Projectiles, Heavy Forgings, Breech Blocks, Winches.



H. K. PORTER COMPANY, Inc.

PITTSBURGH, PENNSYLVANIA

FACTORIES:

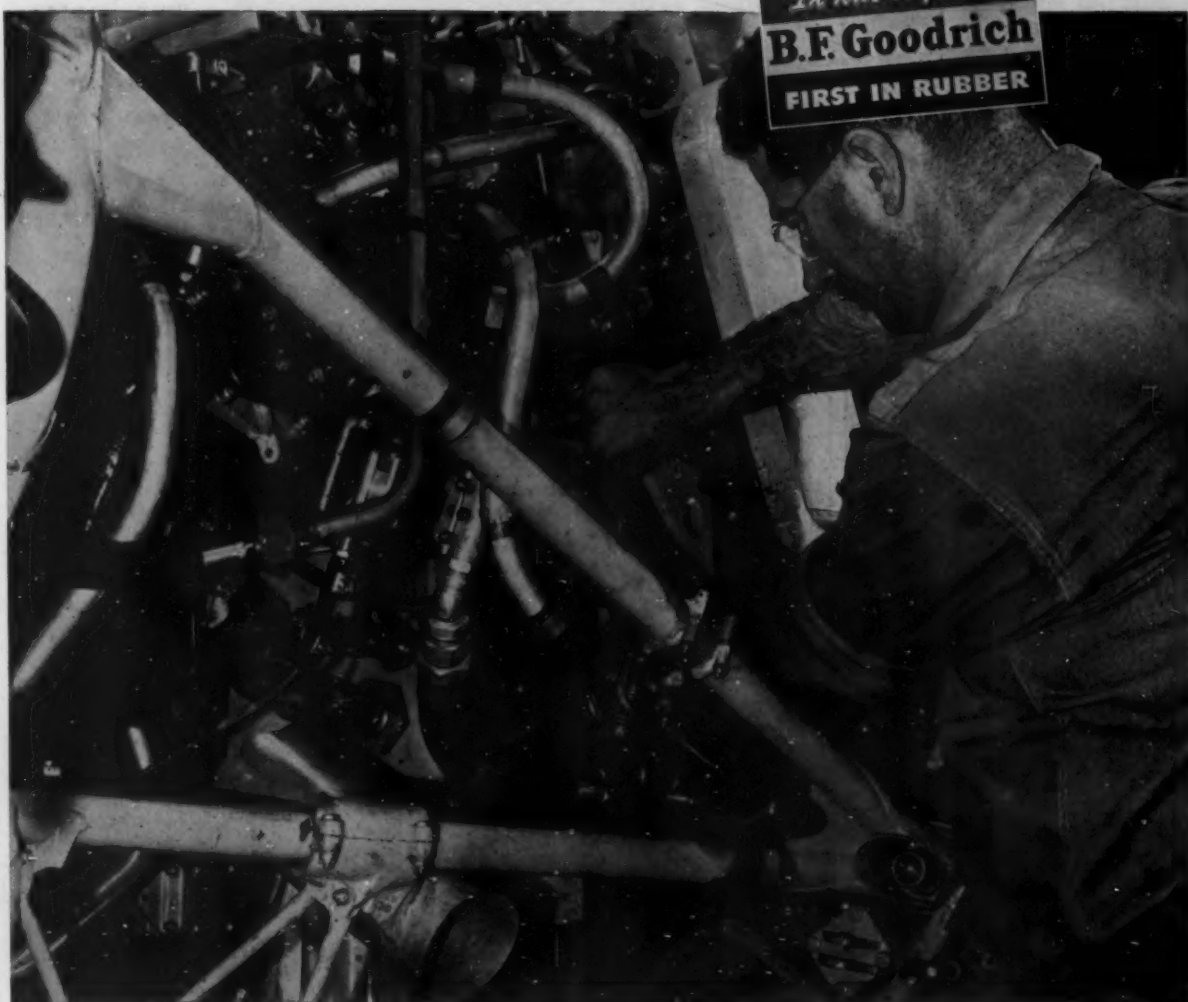
PITTSBURGH, PA.

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MT. VERNON, ILL.



Streams of oil make muscles for airplanes

A typical example of B. F. Goodrich development in rubber

SOME airplanes are so big it takes hundreds of pounds of pressure to move the wing flaps, landing gear and brakes. It's done by hydraulic systems, in which the power flows through streams of oil in pipe and hose. But if the hose is shot or damaged, the control won't work and men's lives may be endangered. Attaching couplings to new hose took giant presses, and they can't have those on every jungle airport.

Then, new couplings were developed which could be attached in the field. But the couplings wouldn't work. The

rubber in the hose would stretch or "flow" when squeezed between the parts of the coupling—then sudden pressure in the hose would loosen the coupling.

B. F. Goodrich engineers were asked for a hose to make these couplings practical. They designed a hose that had no layers of rubber outside or between the cord layers. Instead they forced the protecting rubber down into the fibers of the cord as it was braided around the inner tube. There was no free rubber to "flow"—the jaws of

the coupling bit into hard rubberized cords only, and held.

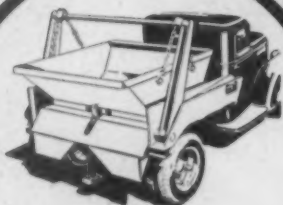
This new hose was the first cotton braided hose ever made that would stand the high pressures—as strong as wire braided hose formerly used, and much lighter. It's already on thousands of planes—another case where a B. F. Goodrich development has made some other development practical. *The B. F. Goodrich Co., Industrial Products Division, Akron, O.*

B.F. Goodrich

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Trade Mark Registered



**Speed up
rock material handling**
by mounting Load Luggers
on your trucks!

It's the modern unit for
quarry operations, feeding
crushers, disposing of over-
burden, hauling to and from
stock-piles.

Write for Catalog No. 44
... and ask about the new
TruckCrane Boom Attach-
ment for the Load Lugger.



FOR MAXI- MUM TRUCK EFFICIENCY

Use five to ten
detachable
"bodies" or
dump buckets
with each Load
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Tilt-type, skip
type and special
buckets avail-
able in various
capacities.

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ROCK PRODUCTS, June, 1944

Quarrying Plans for Tomorrow *call for Lorains*

FAR-SEEING management is again giving Lorains a leading place in their postwar plans, and there are a number of good, sound reasons why.

These operators realize that to maintain a prominent position in tomorrow's competitive market the need for efficient, dependable and low-cost shovel operation will be more important than ever.

They know, too, that Lorains' outstanding prewar performance combined with war-proven developments and improvements will make them even better fitted to meet performance requirements on the jobs coming up; that Lorains' field-tested engineering and rugged construction mean added years of steady, productive service, assuring the maximum return on their investment. Also, because of their extra power and speed, Lorains are naturally better qualified to deliver the big tonnage they'll need to operate, consistently, at a profit.

Contact your Lorain distributor when planning your peacetime equipment setup. He has at his command the experience you need in selecting the equipment that will best serve your particular requirements and can give you many convincing reasons why *your next shovel should be a Lorain.*

THE THEW SHOVEL COMPANY • Lorain, Ohio

THEW *Lorain*
SHOVELS • CRANES • DRAGLINES • MOTO-CRANES

OF COURSE ITS A LORAIN





**Twenty Large Pages
Fully Illustrated
Bulletin No. 389**

This New Bulletin Might Easily Save You Many Hours of Precious Working Time . . .

For more than twenty years "Bill" Dickie has been helping users of Rotary Kilns, Coolers, Dryers, etc., to overcome mechanical difficulties. The troubles some of these people have had "shouldn't happen to a dog", but Bill has found answers to most of them and he tells here, in his own language, just what was done to keep the job going—either permanently or until replacement parts could be secured.

The big idea, however, is to PREVENT TROUBLE, through proper precautions in unloading, erecting, and lining up the kilns before they go into operation and by watching out for unfavorable conditions

which might cause trouble if not corrected in time. It's all here in plain words—that anybody can understand and all experienced operating men will appreciate.

We want everyone whose responsibilities include the operation of Rotary Kilns, Coolers, Dryers, Retorts, Calciners, etc., to have a copy of this bulletin (No. 389) and will mail it promptly on request. Write today for a free copy and tell us, also, about any processing problems or requirements within the scope of the Vulcan equipment listed below. Our engineers will be glad to make constructive suggestions without charge or obligation of any kind.

VULCAN IRON WORKS

Established 1849.

Main Office and Works WILKES-BARRE, PA., New York Office 50 Church

Rotary Kilns, Coolers and Dryers
Rotary Retorts, Calciners, Etc.
Improved Vertical Lime Kilns
Automatic Quick-Lime Hydrators

Toothed, Double-Roll Crushers
High-Speed Hammer-Type Pulverizers
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Heavy-Duty Electric Hoists
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Scraper-Loading Hoists
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Steam Locomotives
Diesel and Gasoline Locomotives
Diesel-Electric Locomotives
Electric Locomotives and Larrys

W

The Case of "SLATE DISPOSAL HEADACHES"

How a large bituminous coal producer
solved a most troublesome problem



THE COMPANY AND PROPERTY:

The Weirton Coal Company, Isabella Mine, located in Southwestern Pennsylvania.

THE PROBLEM: Aerial tram equipment lacked adequate capacity to remove all of the slate and mine refuse of present peak operations — continued steady use of tram would necessitate costly moving of towers in two or three years. Use of small trucks to supplement tram for slate disposal was tried but proved to be unsatisfactory because of high operating and maintenance costs.

THE SOLUTION: Five small trucks were replaced by two Model 2FD Rear-Dump EUCLIDS of 15-ton capacity. One of the Euclids is used as a standby unit because of the six day 'round the clock operation. Both the aerial tram and second Euclid are put into service only at peak periods, a single Euclid being adequate to handle average output of slate.

THE RESULT: The company has reduced their cost of hauling and dumping slate and refuse, and has greatly prolonged the usefulness of the aerial tram in its present location. The standby Euclid is used one or two shifts each week to haul coal for the company's beehive coke ovens. When the two Euclids were purchased to replace the small trucks, it was thought that steady operation of the aerial tram would have to be continued, but the speed and capacity of the Rear-Dump EUCLIDS has made tram use unnecessary except at peak periods.



● If you have a problem of moving large amounts of earth, ore, rock, or coal on off-the-highway hauls, call on your Euclid distributor or write us direct if you prefer. A recommendation based on practical applications of Euclid equipment on similar jobs involves no obligation.

The EUCLID ROAD MACHINERY Co. . . . Cleveland 17, Ohio

EUCLID

SELF-POWERED
HAULING EQUIPMENT

For EARTH . ROCK . COAL . ORE





We'll pick the Timken Bit to match it!

Four major factors are responsible for the outstanding success of the Timken Rock Bit: our superior method of attachment, with shock-taking shoulder; a bit for every kind of rock, each scientifically designed to do its special job with maximum effectiveness; our intimate knowledge of rock formations and rock drilling; nation-wide service facilities from 15 factory branches supplemented by a network of Authorized Distributors, conversion and reconditioning shops, all strategically located for instant availability.

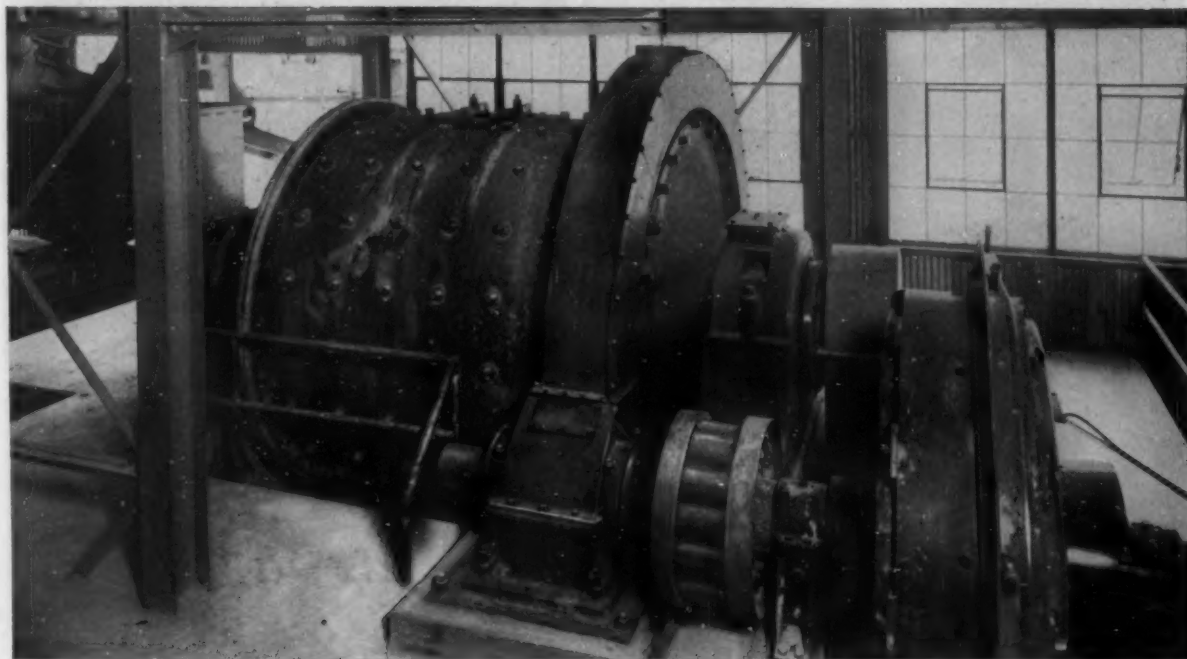
Important as the performance of the Timken Rock Bit is today, it will be even more important during the intensive years of reconstruction that lie ahead; then its ability to effect radical savings in time and cost will help users to operate profitably while meeting any competitive challenge.

That's why it will pay you to adopt Timken Bits *now*. May we have the privilege of discussing your rock drilling problems with you in the near future? The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROCK BITS

BALL MILLS

COMPARTMENT MILLS



WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Sifters
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

WELDED SHELL!

The steel body or shell of this mill, like the shells of all Traylor Grinding Mills, whether of the $\frac{3}{8}$ " thickness of a tiny 3'-0" x 3'-0" machine or of $1\frac{1}{4}$ " plate used for the mighty 8'-0" dia. x 50'-0" Compartment Mill, is in one piece. The original welding technique developed by us fuses the edges of the individual plates in such manner that the joints actually are stronger than the parent metal. This makes for the strength and thorough reliability of the whole machine that are invaluable to operators.

This shell construction is only one of the many mechanical features of Traylor Grinding Mills that single them out in the crowd—the building-in of ideas of our engineers, based on their intimate knowledge of the work to be done, knowledge gained by incessant observation and study. To investigate Traylor Grinding Mills is to install—to install is to enjoy big profits and permanent satisfaction. Consult us!

P. S.—The shells of Traylor Rotary Kilns, Coolers and Dryers are built like this, too!

Write for Bulletin 2103

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It isn't hard to build a truck. But it's mighty hard to build a truck to match a Mack! And there's a reason. Back in 1900, John Mack set out to build the best truck in the world. His very first Mack stayed in service 17 years. Today we go forward with his same idea—backed by all we learned along the way. Big or little—heavy or light—no matter what type of Mack you own, you can be sure you'll get your money's worth in work. That's what "Built like a Mack truck" means. And the record says it means it *more* with every passing year.



Mack Trucks, Inc., Empire State Building, New York, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J. Factory branches and dealers in all principal cities for service and parts.



Mack

**TRUCKS
FOR EVERY PURPOSE**

ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY...IF YOU PLAN TO GET ONE, YOU'RE WISE!



YOU'LL FIND NO "OIL HOGS" HERE

NOT with Gardner-Denver Water Cooled Portable Compressors on the job!

Because they are fully water cooled, they run cooler—use less lubricating oil. Rarely is it necessary to add any oil between regular oil changes.

And because they run cooler, they deliver cooler air—cause less wear on hose.

You'll find Gardner-Denver "Portables" equally efficient in winter or summer—at high altitudes or low. In winter, warm water from the engine circulates through the cylinder jackets, thoroughly warming the compressor before it is started. In summer, the circulating water keeps the compressor cool.

Investigate these "oil saving" water-cooled compressors and other Gardner-Denver cost-cutting equipment. Write Gardner-Denver Company, Quincy, Illinois.



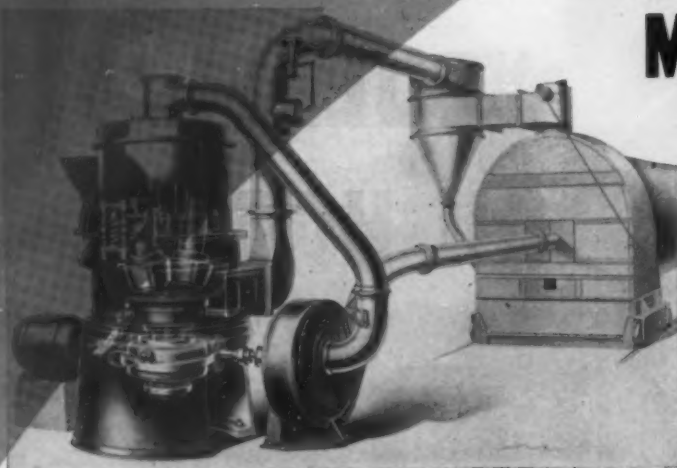
For faster drilling and extra maneuverability, even over the roughest ground, check the Gardner-Denver UM-99 Wagon Drill. Ability to handle full six-foot steel changes quickly, means faster drilling on deep holes.



GARDNER-DENVER

Since 1859

Modernize Your



For Kiln Firing Efficiency, Use the Raymond BOWL MILL

This direct-firing unit is the answer to your kiln problems. Handles any grade or moisture coal and "dries in the mill." Maintains uniform grind . . . provides easy control. Results in increased kiln production, improved lime quality, minimum attention, reduced fuel and maintenance costs.

Ask for Catalog No. 43.



For High Purity Hydrated Lime ... Use the Whizzer Type Automatic Pulverizer

It handles the material through the full cycle of production: — Receives lime from hydrate bin, disintegrates and classifies the material, rejects hard particles or impurities, and delivers a uniform finished product of super quality. Varying whizzer speed controls classification from agricultural lime to superfine chemical hydrate at 99.5% passing 400-mesh.

Ask for Catalog No. 37.



Complete Line of Equipment for Drying, Grinding, Separating, Direct-Firing, Conveying and Cooling. Refer your problems to Raymond engineers.

RAYMOND PULVERIZER DIVISION

Combustion Engineering Company, Inc.

1207 North Branch Street

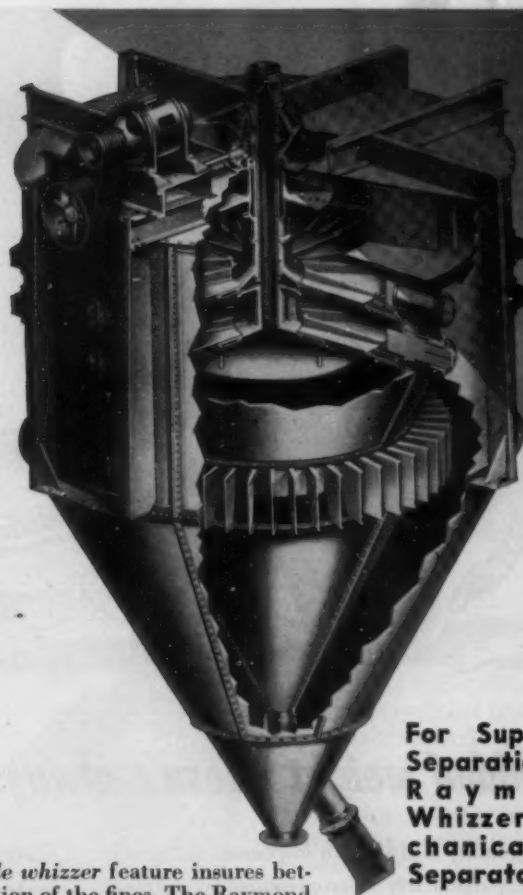
Chicago 22, Illinois

ouime Production



Equip-
Grind-
Direct-
and
r prob-
engi-

Bowl Mills, Roller Mills,
Imp Mills, Screen Mills,
Automatic Pulverizers,
Mechanical Air Separators,
Dust Collecting Systems, Laboratory Units.



**For Superfine
Separation...
Raymond
Whizzer Me-
chanical Air
Separator.**

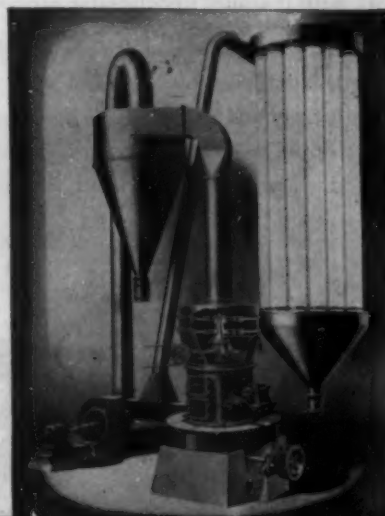
The *double whizzer* feature insures better separation of the fines. The Raymond Mechanical Air Separator may be used in combination with the Automatic Pulverizer to obtain much larger capacities.

Ask for Catalog No. 45.

**For Pulverizing:
— Burnt Lime, Dolomite,
Agstone and Limestone
Fillers...
Raymond ROLLER MILL**

Heavy-duty grinding... where you require big tonnages at low costs... the machine that "can take it" is the Raymond High Side Roller Mill. Built with double whizzer separator for wide range fineness control. Throw-out attachment, optional, for removing impurities and refining the product.

Ask for Catalog No. 51.



Sales Offices in All Principal Cities

Canada: Combustion Engineering Corporation, Ltd., Montreal



But added weight doesn't always mean added strength—

IN piping, safety is always an important element to consider, particularly when pressures are extreme. But when it comes to the common run of moderate and low pressure services Taylor Spiral Pipe will give you a greater safety factor than you need, and along with it almost unbelievable economy.

The happy combination of light weight and great strength is achieved by the spiral seam which reinforces it from end to end. This construction makes Taylor Spiral stronger, gauge for gauge, than even the best seamless pipe . . . cuts its installed cost

down to about half that of the heavy pipe it so adequately replaces.

Switching to Taylor Spiral Pipe for services like those listed here is made easy by the complete range of sizes and wide variety of fittings. Thicknesses range from 18 to 6 gauge; sizes from 4 to 42 inches; joint lengths up to 40 feet. All types of end joints and couplings, all kinds of fittings and specials or fabricated assemblies, are produced by Taylor Forge, assuring a complete service with undivided responsibility.

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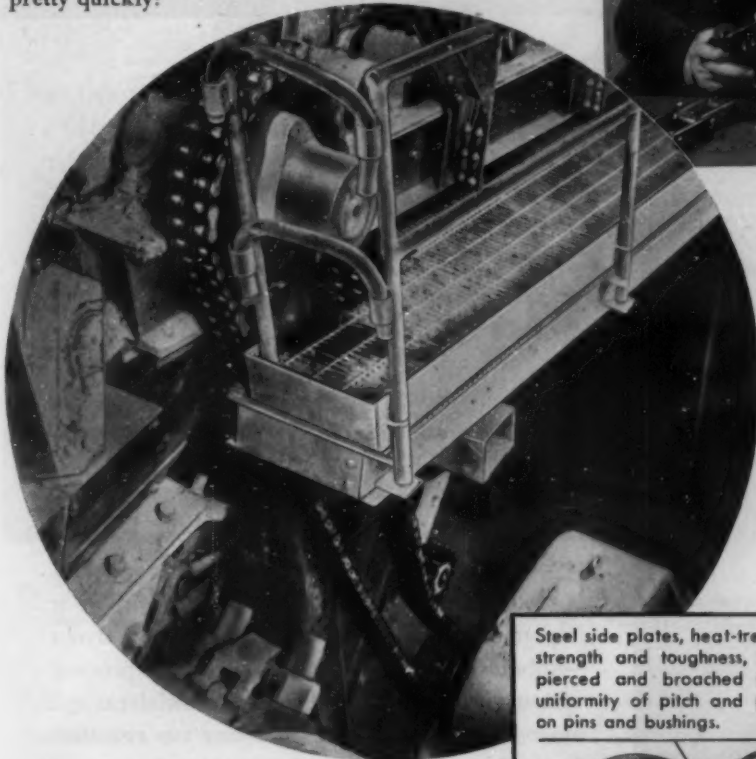


CHANGE TO TAYLOR SPIRAL PIPE FOR:

- High and Low Pressure Water Lines
- Low Pressure Steam and Air Lines
- Steam and Diesel Exhaust Lines
- Vacuum and Suction Lines
- Blower Piping
- Sand and Gravel Lines
- Industrial Gas Lines
- Oil and Gas Gathering Lines
- Swing Pipe
- Spray Pond Piping
- Hydraulic Mining
- Dredge Lines

THIS CHAIN BELT SHOULDERS HEAVY LOADS

① WORKING IN CEMENT MILLS, sand and gravel plants, or quarries, a chain belt drive really gets acquainted with heavy loads. Rex Roller chain belts are designed and built to shoulder these heavy loads and come up ready for more—to deliver positive power in this severe service where design and manufacturing flaws show up pretty quickly!



③ NOTE THIS CLOSE-UP. It tells the story of why Rex Roller chain belts have the strength and toughness for cement mill service. Only the highest quality workmanship and materials go into the manufacture of these chains. For strength, compactness and high efficiency, it has no equal. Made in manufacturers' standard sizes, in single, double and other multiple strands.

* * *

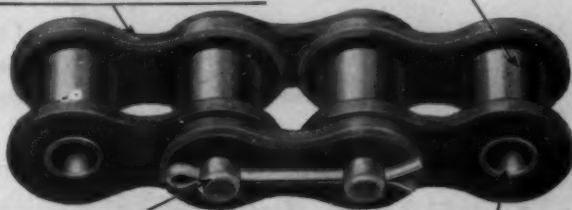
Rex Roller chains are the answer to almost any problem involving positive transmission of power under heavy loads. The Rex Man can help you with your chain belt application problems. And for engineering data on Rex Chain Belts, ask for the 768 page catalog No. 444. Chain Belt Company, 1649 West Bruce Street, Milwaukee 4, Wisconsin.



② FOR INSTANCE, the Rex Roller chain drive in this cement mill knows what heavy loads mean. It drives the apron feeder that carries rock to the crusher. The heavy shock loads on this equipment don't bother this chain belt. It keeps right on rolling without costly shutdowns.

Steel side plates, heat-treated for strength and toughness, blanked, pierced and broached to insure uniformity of pitch and press fits on pins and bushings.

Alloy steel roller heat-treated for extreme toughness and resistance to wear, then ground to size.



Alloy steel pin, case hardened, ground for accuracy, superior bearing surface. Shorter pitch chains furnished with riveted construction.

Alloy, case hardened steel bushing ground for accuracy and press fits in side bars.

REX CHAIN BELTS

More than 2000 sizes and types for the positive transmission of power, timing of operations and conveying of materials.

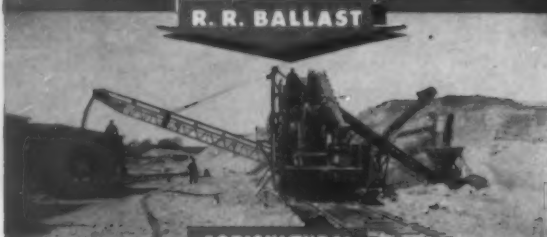
CHAIN BELT COMPANY OF MILWAUKEE

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Pioneer can deliver

ESSENTIAL CIVILIAN EQUIPMENT

R. R. BALLAST



AGRICULTURAL LIMESTONE



MINING



AIRPORTS



ESSENTIAL HIGHWAYS



● This is the kind of advertisement you used to read a couple of years ago when manufacturers like us solicited your business. Today, Pioneer is at your service—and soliciting your business again.

At the beginning of the War Pioneer was called upon to produce the big equipment — the large portable plants used in basic construction work. We delivered the big Pioneer plants to the Government. We've done the job assigned to us.

The completion of these war orders finds our expanded production facilities and increased personnel in a position to produce crushing, screening, and handling equipment for essential work—such as Mining, Railroad Ballast, Agricultural Limestone, Airports, Essential Highways.

You'll find us prepared to help you with your important equipment needs—ready to design layout—submit it for your consideration—and proceed with manufacture for early delivery. On plants and most units, releases and priorities are essential. On feeders and screens, only suitable priorities are needed. We, or our distributors, will help you with the necessary applications.

This is a good time to get your equipment needs under consideration—work out details. Working and planning with Pioneer involves no obligation. We're ready to set up an early meeting with you. Write today.

Pioneer

ENGINEERING WORKS

Jaw Crushers • Roll Crushers • Screens • Conveyors • Feeders • Washers

MINNEAPOLIS 13, MINNESOTA

ENGINEERS and
MANUFACTURERS of
QUARRY-GRAVEL
AND
MINING MACHINERY

NEW YORK HERALD TRIBUNE, SATURDAY, MARCH 11, 1944

U. S. Bakers at Anzio Beachhead Work Under Shellfire

Work Under Shellfire

Be Black Night, but never Slips

giant Tribune Inc. BEACH- March 10. ry is a good shelling. ves with a t know that ble bakery zio have had

en under shell since Second H. Gewolb, of e, New York, y in. It was bakers had artillery, and trouble con-

g bread, you and with around it's Corporal John Detroit, who t for awhile overed he had twenty years nts were not n a 40-mm.



Flour bags afford air-raid protection for American soldiers of the mobile bakery company in Italy.

Marines Talas In N

Cut Willa Army and in

SOUTH LIED HE 11 (Saturday marines ca Airdrome wheeled n town of thus cutting mez Penins of New Br invaded on Allied H nounced which esta las MacArt one hund Cape Gl within 170 Rabaul.

A spokes action whi hours after rine Division on Monday tensity on T landing on peninsula, cleared a pa and pushed wide penin The occ

"Delivering the Goods" for Victory!

This photo taken "Somewhere in Italy" tells more about Multiwall Paper Bags than could be expressed in thousands of words. (1) The foodstuffs are right up where the fighting men need them; (2) kid gloves were not used to handle the bags; (3) not a single bag

has broken, not a speck of flour has been lost, despite abrasion from G.I. trench shoes.

"Foods Fights for Victory" would be a truthful caption for this unretouched* photo of Multiwall Paper Bags containing flour.

*Except for required changing of soldiers' faces.

Multiwall Paper Bags are required for industrial shipments of food products, chemicals, fertilizers, and construction materials — for domestic use and overseas to our armed forces and civilian populations of allied nations and occupied countries.



MULTIPLY PROTECTION • MULTIPLY SALEABILITY
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TAGGART CORPORATION • THE VALVE BAG COMPANY

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BALTIMORE 2: 1140 Baltimore Trust Bldg. SAN FRANCISCO 4: 1 Montgomery St.

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HATES VALVE BAG CO., LTD.
Montreal, Quebec
Vancouver, British Columbia

Boston, Mass. Birmingham, Ala. Dallas, Tex. Denver, Colo.
No. Kansas City, Mo. Los Angeles, Calif. New Orleans, La.
Franklin, Va. Seattle, Wash. Nazareth, Pa. Toledo, Ohio

CORRECT Lubrication **means Better Maintenance**



U. S. Signal Corps Photo

CORRECT lubrication makes for better maintenance by preventing excessive wear.

Sinclair **TENOL-200** provides *correct* lubrication under heavy duty operation for Diesels, and Diesel-powered bulldozers, buckets, and shovels. Sinclair specialized oils and

greases are highly efficient on all types of hard worked equipment.

Where operating conditions threaten excessive wear and overhaul shutdown there is a lubrication problem. Consult us about it.

(Write for "The Service Factor" — published periodically and devoted to the solution of lubricating problems.)

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

Power... precedes progress

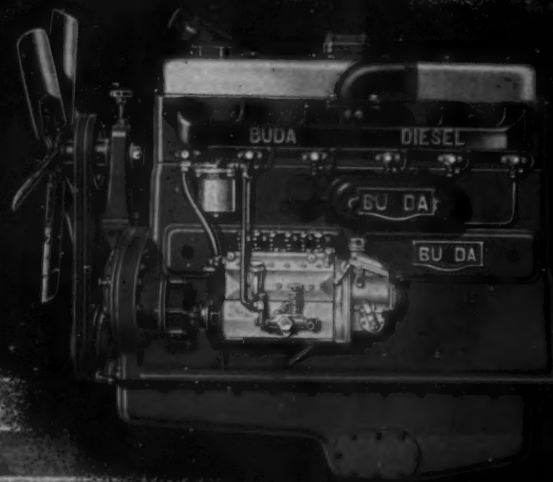


BUDA
Service is
Nation-Wide

Proof that BUDA

"Low Pressure" Diesel engines deliver steady, reliable, economical power, month after month, is found in their years of dependable service. For lower operating and maintenance costs, less down time and longer engine life — specify BUDA - Power.

Write for bulletin.



BUDA

15428 Commercial Ave., Harvey (Chicago Suburb) Illinois

TWO STEPS TOWARD

- These two Kuntz systems have put scientific precision into the manufacture of lime. Both have exclusive advantages that permit better control of operations, manufacture better lime products and require less power and a lower initial investment.

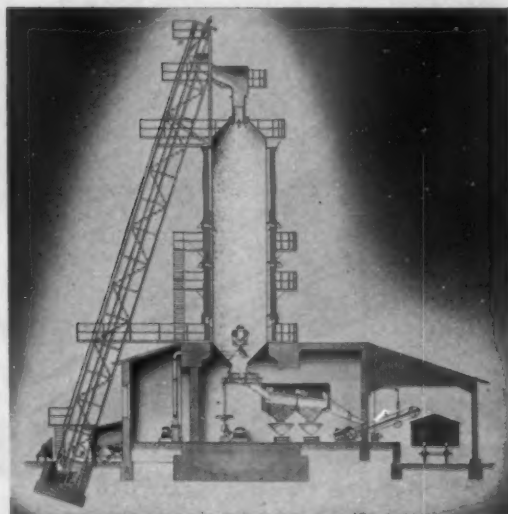


YORK-KUNTZ VERTICAL LIME KILN

The automatic Lime Kiln. It not only eliminates crushing, thereby cutting overall investment, but also gives continuous control of manufacture. That is why it also permits a uniform burn that reaches the absolute peak of lime-fuel efficiency known to the industry. Provided for either mixed-feed, gas or coal firing, York-Kuntz Vertical kilns are the answer for the operator who seeks to increase quality and saleability of his product as well as conserve precious manpower.

1

- • Elimination of crusher plant; less ground space.
- • • Automatic operation requiring only one man per shift.
- • • Continuous charging, flow and discharge control for complete burning.
- • • Lime discharged in large pieces, with separation and recovery of fines.



Write for information on these McGann Products:

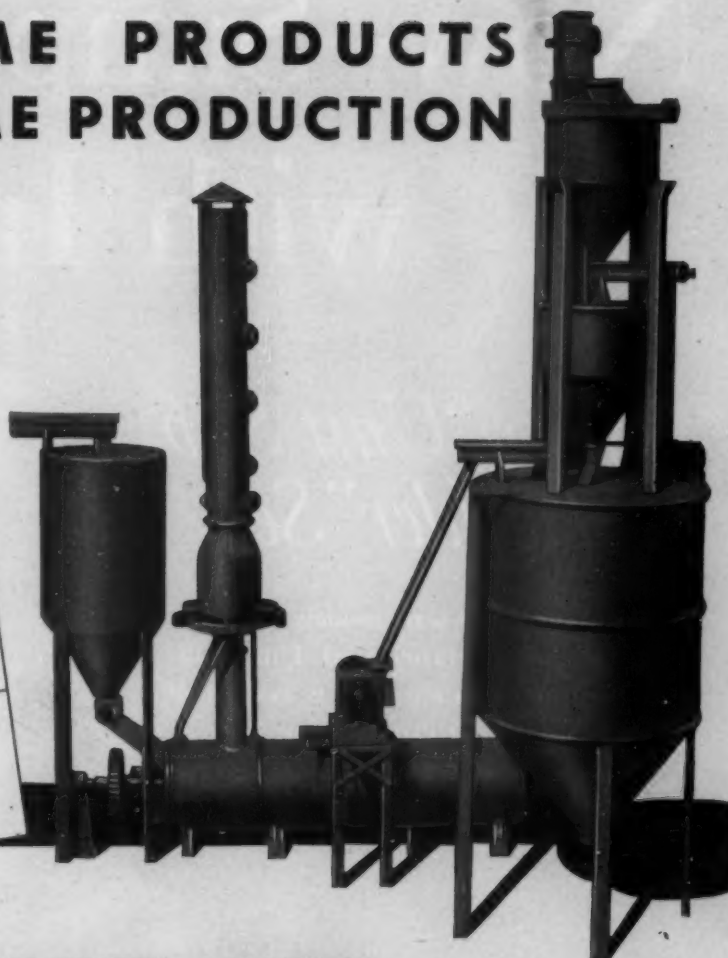
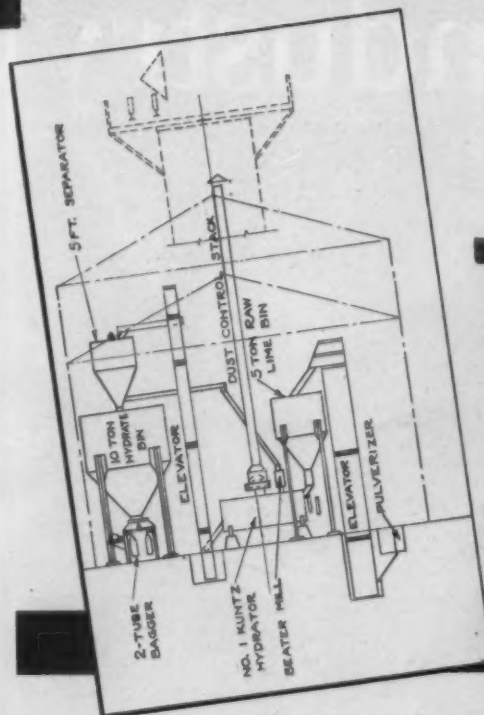
LIME PLANTS COMPLETE
DRYING MACHINERY
GREY IRON CASTINGS

SHAFT KILNS
ROTARY KILNS
SUGAR MACHINERY

HYDRATORS
TANKS
BINS

Special Machinery from Engineer's Designs

1. better LIME PRODUCTS 2. faster LIME PRODUCTION



KUNTZ GRAVITY SYSTEM of LIME HYDRATION . . .

2

Absolute control of the hydration process within one unit.

A more uniform, high quality lime product.

Savings as much as \$1.50 per ton because patented dust control stops all loss of lime fines.

Application to any type of hydrate plant—batch or continuous method.

- Kuntz remains today the only automatic hydrating system of one-man operation giving 100% control of quality and uniformity. It makes it possible to prepare marketable hydrates to meet more exacting specifications, even with lime having as high as ten per cent impurities and insolubles. Multiple classification as to fineness and purity are prepared in one operation. The pure atmosphere of the Kuntz hydrator provides complete association of lime and water. Elements not CaO or MgO are immediately removed by the initial breakdown of the lime through a patented dam and sump collecting device.

★ ★ LIME & HYDRATE PLANTS CO. ★ ★

Associate McGAND MANUFACTURING COMPANY, INC. York Pa.

Now--Simplify Your with Industry's

New "Unit Sub Builder" Set

With accurate scale models of Allis-Chalmers Prefabricated Unit Sub apparatus, you see what is available, various ways it can combine, how it will look in your plant!



EE
ALLIS

Unit Sub Planning Newest Aid!

PRINT IN BINDING

GUESSWORK IS GONE from unit sub planning when you *see* the elements of Allis-Chalmers Prefabricated Unit Substations — in accurate scale models.

You plan *visually*, effortlessly — without bogging down in charts, tables, diagrams — save time, cut way down on any chance of error.

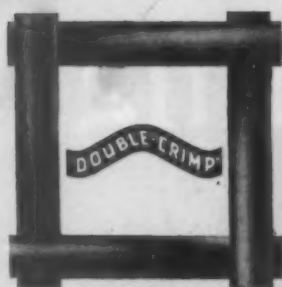
To see for yourself how the new "Unit Sub Builder" Set can help you in your power distribution planning, call your nearby Allis-Chalmers district office.

An A-C field engineer will bring the models, together with the handy new "Unit Sub Slide Rule" for calculating breaker capacity — and new "Check List" for *double* checking all details. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

♪ Tune in the famous Boston "Pop", Blue Network, Saturdays at 8:30 pm, E.W.T.

A 1746

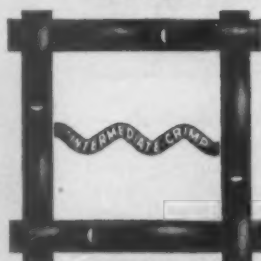
SEE YOUR UNIT SUB IDEAS WORKED OUT WITH
ALLIS-CHALMERS "Unit Sub Builder" Set



Double-Crimp



Arch-Crimp



Intermediate-Crimp



Flat-Top

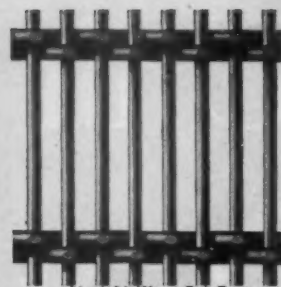
"Perfect" WEAVES

Arch-Crimp
Coiled
Double-Crimp
Double-Fill
Dutch
Flat-Top
Intermediate-Crimp
Rek-Tang
Selvage-Edge
Straight-Warp
Stranded
Sta-Tru
Triple-Warp
Twisted
Twisted-Fill
Twisted-Warp

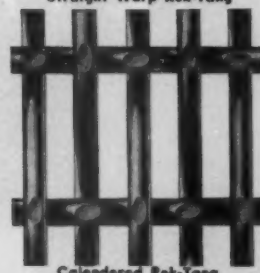
Arc-Welding
Bending
Binding
Brazing
Calendering
Colling
Crimping

"Perfect" PROCESSING

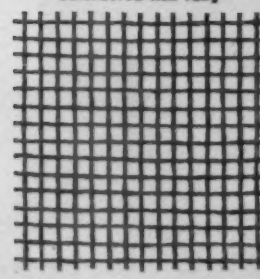
Cutting
Dipping
Dishing
Finishing
Flanging
Flattening
Forming
Framing
Galvanizing
Jointing
Knuckling
Painting
Rolling
Selvaging
Shaping
Shearing
Slitting
Soldering
Spot-Welding
Squaring
Stitching
Tack Welding
Trimming



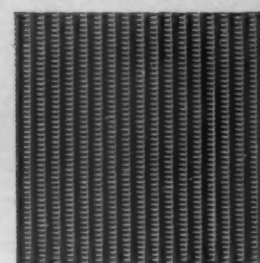
Straight Warp Rek-Tang



Calendered Rek-Tang



Triple Twisted Warp and Fill



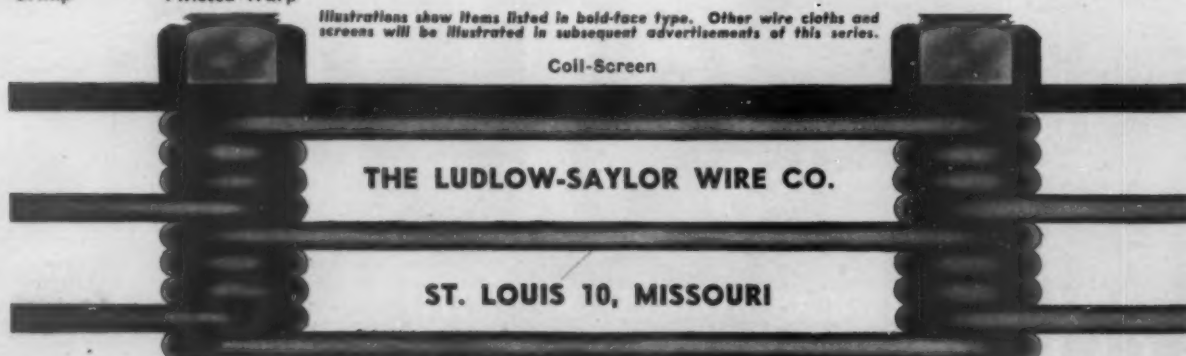
Dutch Weave

"Perfect" PRODUCTS

Baskets
Circles
Coils
Cones
Cylinders
Discs
Forms
Leaves
Lengths
Panels
Pieces
Ribbons
Rings
Rolls
Sections
Segments
Strips
Templates

Illustrations show items listed in bold-face type. Other wire cloths and screens will be illustrated in subsequent advertisements of this series.

Coil-Screen



THE LUDLOW-SAYLOR WIRE CO.

ST. LOUIS 10, MISSOURI



A prominent rock and gravel company, operating this crushing, screening and washing plant, has completely equipped the plant with S-A Vibrating Screens of the heavy duty type.

Engineered AND Equipped BY S-A...

Formula for An Efficient Installation

Stephens-Adamson can aid in practically every phase of rock producing by supplying needed equipment. Amazingly efficient and ruggedly built conveyors of all types, elevators, crushers, feeders, washers and a full range of related accessories... all are supplied from S-A's complete line of manufactured material handling units.

But correctly designed machinery is only a part

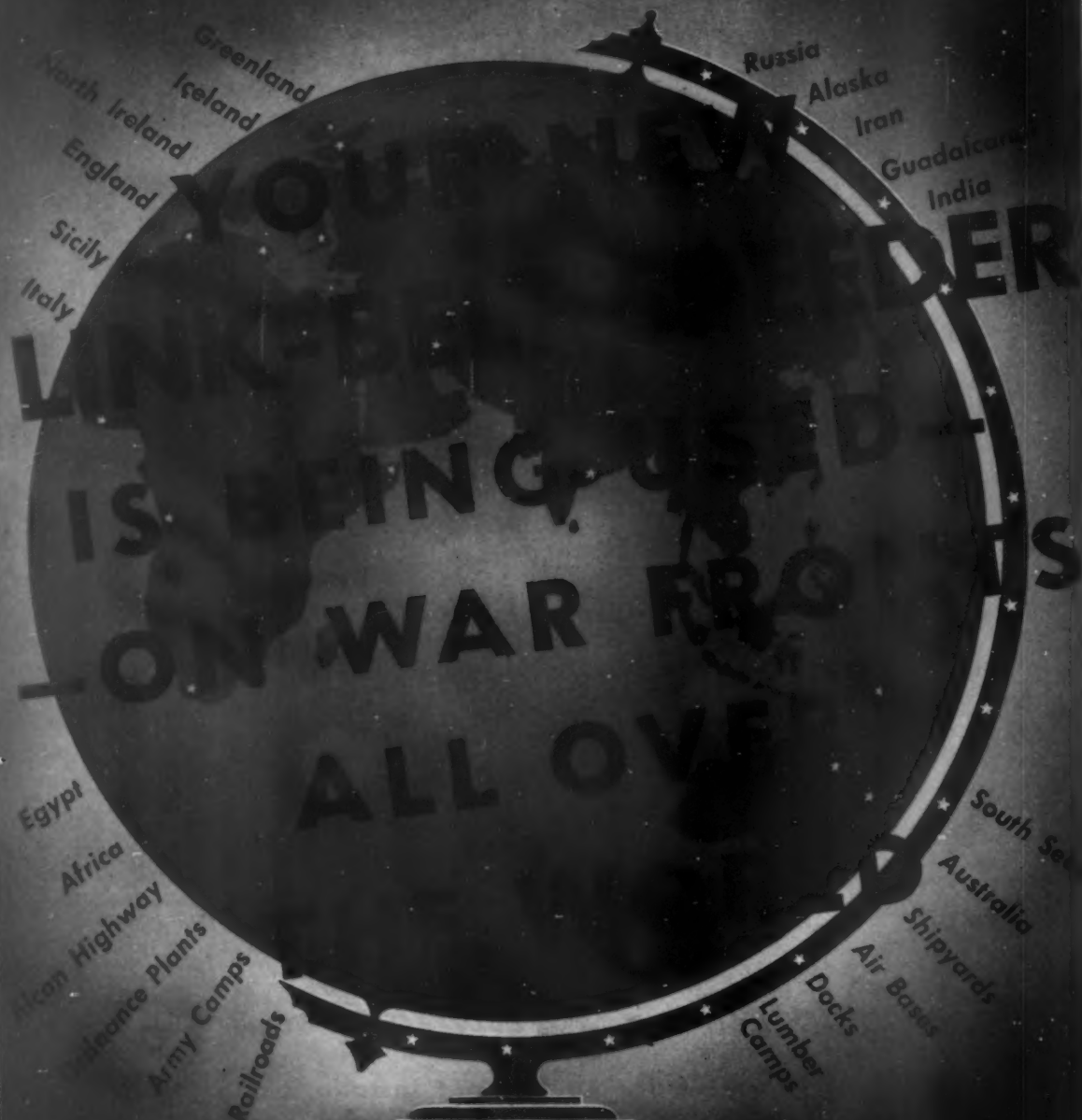
of the story, for it's the way S-A engineers assemble this equipment into completed systems that makes possible such high efficiency at low cost.

It's the S-A combination of *right equipment, plus correct method.*

This combination is available to you. Simply drop us a line for further information—and a call by an S-A engineer if you wish it.

STEPHEN S-ADAMSON
 7 RIDGEWAY AVENUE, AURORA, ILLINOIS MFG. CO. LOS ANGELES, CALIF. ★ BELLEVILLE, ONT.

Designers and Manufacturers of All Types of
BULK MATERIAL HANDLING EQUIPMENT



★ They are lifting, digging, pulling, stacking—performing the many heavy-duty jobs that must be done to get war material to the front. Whether it is building a logging road in Oregon, a thoroughfare to Alaska or docks, camps, roads

and bridges, in Iran, these Link-Belt Speeders are giving yeoman service—showing up at its best the precision engineering—the massive, though light-weight, rugged construction of these easy-to-handle machines.

LINK-BELT SPEEDER

957C



Builders of the Most Complete Line of
SHOVELS-CRANES-DAGLINES



LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO-9, ILL.
(A DIVISION OF LINK-BELT COMPANY)



JUST SUPPOSE!

by Barbara Brown

Olney High School, Philadelphia, Pa.

Note: Several weeks ago, the United States Treasury Department and the Columbia Scholastic Press Association sponsored an editorial contest for the nation's high school students. Subject: War Bonds. Winner: 15-year-old Barbara Brown, a Philadelphia high school junior. In the interests of helping the Fifth War Loan Drive, now in progress, we are proud to print here the stirring message written by Miss Brown.

SUPPOSE there were no tomorrows? . . . Think about it for just a minute . . . No tomorrow for you, or your kid sister at home—or the brother who left for the Army yesterday. Did you ever think that we, who have had so few yesterdays, may have no tomorrows?

It has happened, you know. To Jack Feldman, and to Bob Ernest—and to fifteen other boys who sat in our classes just last year . . .

They will have no tomorrows. They died before they ever had a try at living . . . so that we here at home might have our chance.

There are millions who were asked to give up more than a double feature at the Earle . . . or a spiffy new pair of pumps for next week's formal. A soda is a pretty insignificant sacrifice, when you think of things like—

The kids in Russia, who live on a few ounces of cereal a day. *They've never seen an ice-cream soda.*

The Polish boys and girls, who would be in school right now, just as we are . . . *if there were any schools left.*

The French youths who've never had a hamburger when they were out on a date—or any other time, for that matter. They are old, very old . . . *older than you and I will ever be.*

There are millions of them . . . in Norway . . . Holland . . . Denmark . . . Belgium . . . They would stare in amazement if they could be here to see—

A jalopy painted bright yellow. "The Tin You Love To Touch" printed in big, green letters on the back.

A high school senior, uncomfortable in his first tuxedo . . . calling for his date, looking nervous.

Millions of things that we take for granted . . .

There is such a feeling of permanency in our tight little world. We'll go to school with the gang, today . . . and tomorrow . . .

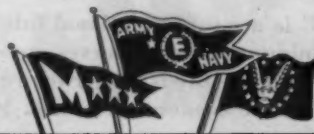


BUT, WHAT IF THERE WERE NO TOMORROWS?
There's only one way to be sure, you know—

Buy War Bonds . . . That's a simple little phrase. It's the American way of saying what we mean in a few direct words. *Buy War Bonds.*

Yes—you and everybody must buy War Bonds. We've got to buy more and more and more of 'em. Just get the idea into your head that your \$18.75 might—just *might* end the war one-fifth of a second sooner. That maybe, in that one-fifth of a second, the boy next door could be on the receiving end of a bullet . . . Then you'll know that it's worth any small sacrifice you have to make! We've got to keep on plugging, saving, convincing. Giving our pin money . . .

Tell everybody—sell everybody! We can't take no for an answer . . . Because we are buying tomorrow—and tomorrow—and tomorrow.



SUPERIOR ENGINES

Division of The National Supply Co.

Executive Offices: Pittsburgh, Pa.

Sales Offices: Springfield, O.; Boston; New York; Philadelphia; Washington, D. C.; Jacksonville; Houston; Ft. Worth; Tulsa; Los Angeles; Chicago. Factory: Springfield, Ohio.

KEEP BUYING WAR BONDS ★

THAT'S WHAT I CALL A LUBRICATION JOB



The LUBRIPLATE film is tough...the toughest lubricating film you have ever used. It holds contacting surfaces apart, even under the heaviest loads, thus effectively preventing progressive wear. Examination of a bearing surface lubricated with LUBRIPLATE always shows a mirror finish.

LUBRIPLATE is a most exceptional lubricant. It keeps friction down to a minimum, thus conserves power. It prevents rust and corrosion. Its effective life is longer than conventional lubricants, therefore it is more economical to use.

The remarkable achievements of LUBRIPLATE are told in the "LUBRIPLATE FILM." It contains case histories and general lubricating information written especially for your industry. Send for a copy today.

LUBRIPLATE DIVISION

FISKE BROTHERS REFINING COMPANY

NEWARK, N. J.

SINCE 1870

TOLEDO, O.

WRITE FOR THE NAME OF THE DEALER NEAR YOU

R

FOR YOUR MACHINERY

No. 1—Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers.

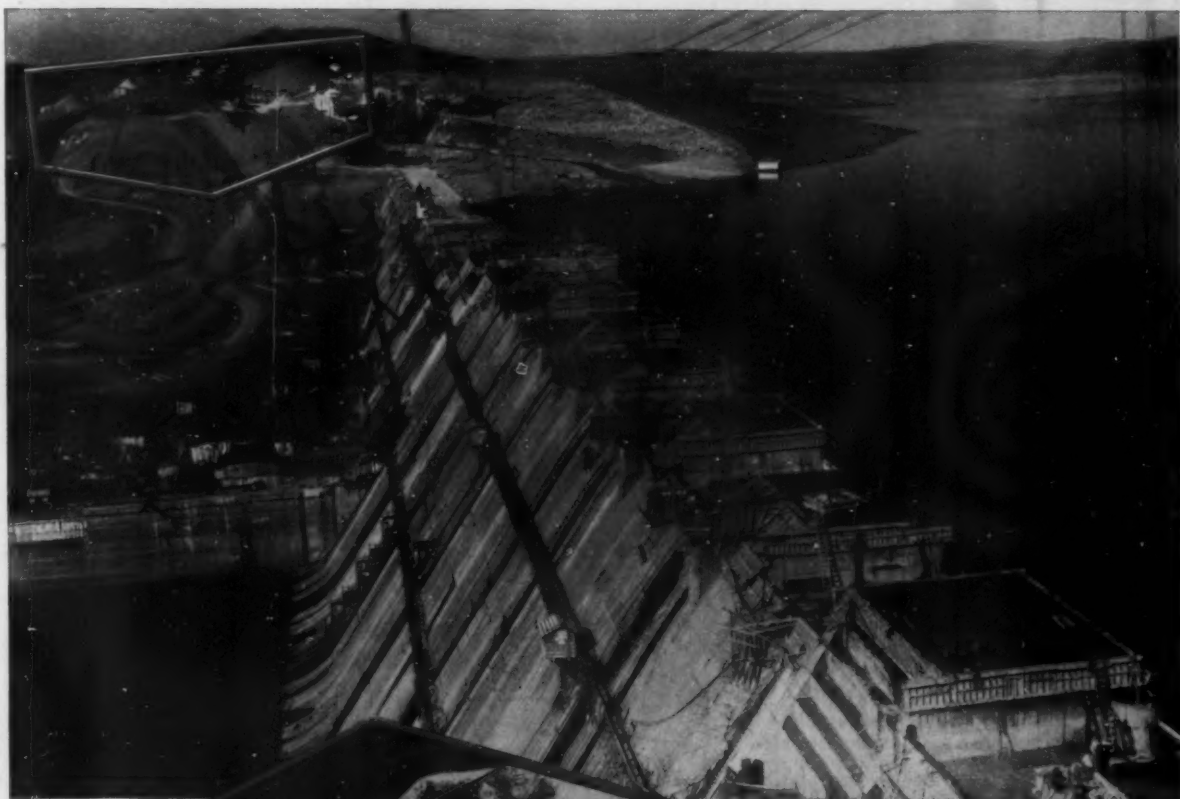
No. 2—Because of its high film strength and long life reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107—One of the most popular grease type products for general application by pressure gun or cups.

No. 70—For a wide range of grease applications, especially at temperatures above 200 degrees F.

No. 130-AA—Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING—This is the LUBRIPLATE lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.



(U.S. Engineering
Dept. Photo)



Close-up of combination gravel and quarry plant outlined above

**500
TONS
AN
HOUR**

TELSMITH PLANT SPEEDS CONSTRUCTION OF NORFORK DAM . . .

On the North Fork River, near Norfolk, Arkansas, the huge Norfolk Dam nears completion. For its 1,500,000 cu. yds. of concrete, TelSmith engineers designed an aggregate plant that produces 500 tons an hour. Sand and gravel come from the White River; limestone from a nearby quarry. Two correlated processing systems are used . . . producing four sizes of coarse aggregate, sand

and limestone dust. Waste is held to a minimum. TelSmith plant-flexibility permits adding dust to sand when necessary. All plant machinery, except some conveyors and electrical equipment, is TelSmith-built. Its "very satisfactory" performance helped expedite concrete placement for Morrison-Knudsen Co. and Utah Construction Co., the general contractors. *Get TelSmith Complete Plant Bulletin EP-11.*

SMITH ENGINEERING WORKS, 508 EAST CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

51 East 42nd St.
New York 17, N.Y.

211 W. Wacker Drive
Chicago 6, Ill.

Cable Addresses: Sengworks Milwaukee—Concrete, London
713 Commercial Trust Bldg.
Philadelphia 2, Pa.

19-21 Charles St.
Cambridge 41, Mass.

G. F. Secler & Co.
Toronto, Ont.

Mines Eng. & Ept. Co.
San Francisco 4—Los Angeles 14

Brandels M. & S. Co.
Louisville 8, Ky.

Charleston Tractor & Ept. Corp.
Charleston 22, W. Va.

Roanoke Tractor & Ept. Co.
Roanoke 7, Va.

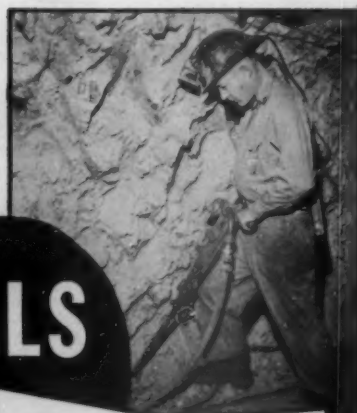
North Carolina Ept. Co.
Raleigh and Charlotte, N.C.

Wilson-Weensner-Wilkinson Co.
Knoxville 8 and Nashville 6, Tenn.

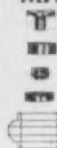
We Quote -
MINE OWNERS
EVERYWHERE...

Thor ROCK DRILLS

"OUT-DRILL EVERYTHING
ON THE JOB"



MINERS ARE SOLD ON THESE THOR PERFORMANCE AND MAINTENANCE FEATURES



• LOW AIR CONSUMPTION

Thor Positive Short-Travel Tubular Valve uses effectively every ounce of air that enters the machine . . . measures air to a tolerance of .00025 of an inch!



• STEADY, FAST DRILLING

Extra-powerful rotation through extra sturdy rifle bar assembly and positive, non-slip ratchet action prevents stalling, even in heavy, sticky formations . . . full air power behind the piston gives the steel maximum forward and rotating power.



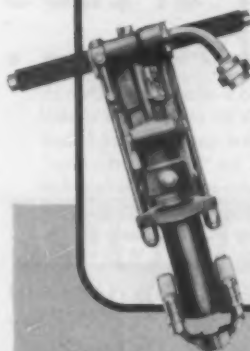
• AUTOMATIC LUBRICATION

On each reciprocation of the Thor piston hammer, oil is forced under pressure through a felt filter pad to keep every part of the machine constantly lubricated.



• OPERATING EASE

The Thor four-position throttle gives the operator complete control of drilling speeds for all operating conditions. Exclusive Thor spring retainer design provides quick, easy removal of the steel—provides longer life with fully enclosed springs that cannot clog or be over-tightened.



• POWERFUL HOLE-BLOWING

Thor air economy in turning every foot of air into power combines with powerful rotation to provide steady, maximum hole-cleaning ability.

Send today for complete information about Thor's wide range of light and heavy duty sinker, drifter and stoper rock drills and associated mining tools in Catalog 42-A.

FROM A MAMMOTH PENNSYLVANIA ANTHRACITE PROPERTY*

"Thor Rock Drill was put through rugged stripping tests and out-drilled everything on the job, showing exceptionally powerful hole-blowing capacity by holding to steady drilling despite hitting three inches of clay every three or four feet."

FROM AN ARIZONA DEVELOPMENT*

"Thor Rock Drill used in five different veins of varied texture and hardness showed such excellent results that runners took it apart to admire fine construction."

FROM A COLORADO OPERATOR*

"Thor Rock Drill drilled as deep as 25 feet in clay streaked conglomerate rock with amazing hole-cleaning power...out-drilled every other tool on every operation."

Straight from the mines come these reports of Thor Rock Drills *out-drilling everything on the job* in all types of underground formations.

On-the-job tests like these are making Thor Rock Drills the popular choice of miners everywhere who *know* Thor performance . . . who *know* the low maintenance, smoother, faster handling made possible by Thor design and construction.

*Name furnished on request.

Thor

Portable Pneumatic and Electric Tools

INDEPENDENT PNEUMATIC TOOL COMPANY



600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

Prior to Pearl Harbor
CRUDE RUBBER



THE SOURCE OF RUBBER ... different today

For many years it was taken for granted that Crude Rubber would always be available to meet the requirements of our nation.

Then came Pearl Harbor!

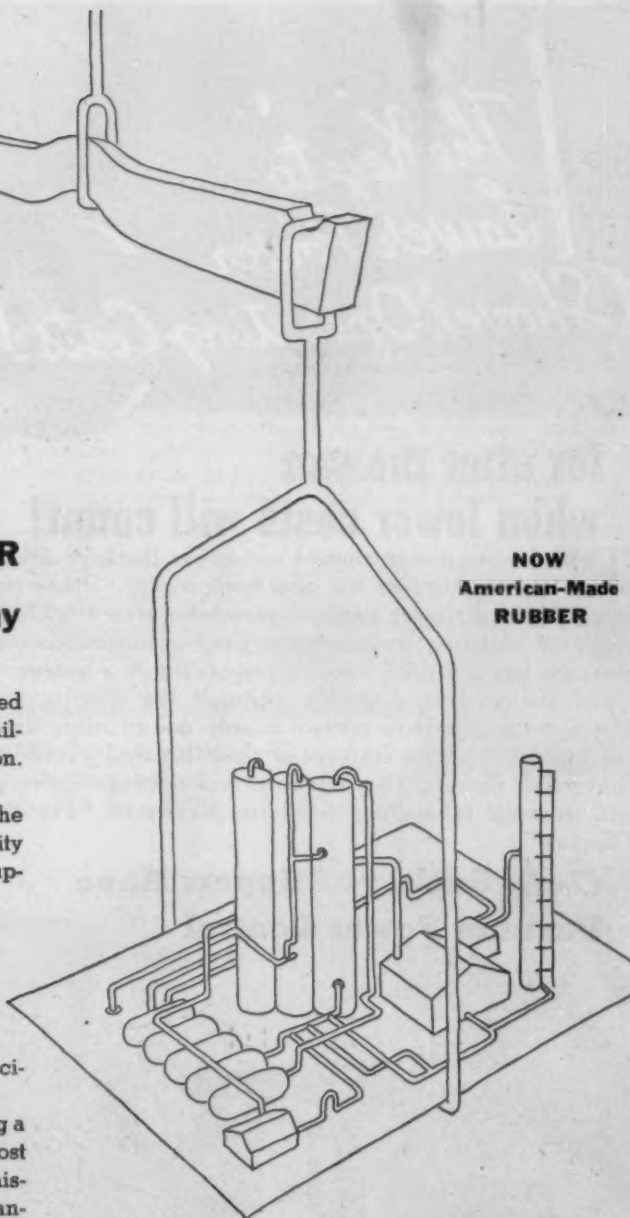
Instantly a vast change was made in the source of supply. Only American ingenuity prevented a complete collapse in the supply of this most vital raw material.

At the start, the production was only a few tons of American-made rubber. In the short space of two years, production is taking care of the War demands. Besides, there is now some American-made rubber available for civilian requirements.

Today, American-made rubber is doing a wonderful job. The United States is almost entirely dependent on it. Don't waste or misuse any product made of rubber. American-made rubber uses American-made raw materials and American Labor and keeps the money in circulation in America.

Quaker for many years has been most active in experimenting and working with American-made (Synthetic) rubber. In many instances, it has already proven better for certain kinds of work than Crude.

NOW
American-Made
RUBBER



When you need Industrial Rubber Products, consult Quaker. Even during these trying days, Quaker has been able to supply Industry with a considerable quantity of Rubber Products, in addition to the large volume of products which we are constantly supplying the Government.

If there is a way to get it done—Quaker will do it!



QUAKER RUBBER CORPORATION

PHILADELPHIA 24, PA. • NEW YORK 7 • CLEVELAND 15 • CHICAGO 16 • HOUSTON 1

Western Territory

QUAKER PACIFIC RUBBER COMPANY • SAN FRANCISCO 5 • LOS ANGELES 21

MEVAC
Vacuum
POWER
CONTROL

The Key to Lower Power Shovel Operating Costs



for after the war when lower costs will count!

THE Mevac power control system—a Buckeye development—conserves the operator's energy. Operators can, and do, dig more yards of gravel day after day. Mevac is easier on clutches, brakes and engine—maintenance and fuel costs are less. Six small handles, responding to a feather touch, speed the Clipper smoothly through the digging routine. Mevac vacuum power control is only one of many exclusive but proved-in-service features of these sturdy $\frac{1}{2}$ and $\frac{3}{4}$ yard convertible shovels. They cut costs on stripping, digging gravel and stockpile rehandling. Send for a copy of "The Age of Clippers."

Only Buckeye Clippers Have Vacuum Power Control



Buckeye Traction Ditcher Co.
Findlay, Ohio

Built by Buckeye ✓

Convertible Shovels Road Wideners Trenchers
Spreaders R-B Power Finegraders Tractor Equipment

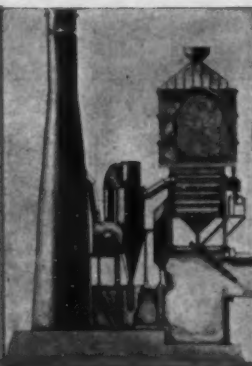
The LATEST in SCIENTIFIC LIME PRODUCTION

• For the Large Producer

• For the Small Producer

... for the Large
Producer ...

**KENNEDY
STONE
PREHEATER
and
DEHEATER**



Just as the Army Air Corps uses a different type plane for its numerous and varied missions, we offer a lime manufacturing unit best suited for the large scale producer and one for his small-volume counterpart. Both produce the best grade of lime and do it most economically in their volume range.

- 20% INCREASE IN CAPACITY
- 40% SAVING IN FUEL
- A BETTER PRODUCT

The KENNEDY Preheater and Deheater provides a complete answer to the lime producers who want to combine the superior product of a rotary kiln with the operating economy of a vertical kiln.

This equipment effects a partial calcining of the material, thereby reducing kiln wear and kiln lengths. It recovers and utilizes exit gases, and has proved so efficient in actual operation that 40% fuel savings and increased output exceeding 20% have been recorded. At the same time a better quality of lime has been obtained.

Short kilns employing the Kennedy method also acquire an internal glaze which lessens the wear on kiln liners, lowers the power requirements, and reduces formation of kiln rings. Overburned and underburned lime is practically eliminated. Coal feed and lime calcination are switchboard controlled.

Write for descriptive
literature

We have a very large line of mining, crushing, cement, lime-burning and pulverizing equipment, and pulverized coal equipment. If interested write for special bulletins.

... for the Small
Producer ...

**KENNEDY VERTICAL
CONTINUOUS DISCHARGE
KILN**

If your lime market is too small to warrant a Preheater and Rotary Kiln installation you can produce a better grade of lime five to ten tons daily with the Kennedy Vertical Continuous Discharge Kiln. It has a lower power requirement, high thermal efficiency and produces a high quality product.

The kiln is designed to calcine stone ranging in size from $\frac{1}{4}$ " to $1\frac{1}{4}$ ", thus utilizing what would ordinarily be waste for the old type vertical kiln. Simple to erect and to operate. The heat is thermostatically controlled, making the kiln practically automatic. It discharges continuously, eliminating overburned or underburned lime.



This kiln will have a capacity of approximately 10 tons per day of 24 hours.


KENNEDY-VAN SAUN MFG. & ENG. CORPORATION

Representatives in All Principal Cities of the United States


2 PARK AVENUE
NEW YORK, N. Y.

FACTORY
DANVILLE, PA.





Plant of the Permanente Cement Company at Permanente, Calif., which is equipped with grinding balls made by the American Forge Company.



FIFTY-SIX YEARS OF FORGING EXPERIENCE

together with modern and adequate equipment, are offered to the mining, oil, lumber, marine and industrial fields by the American Forge Co. specializing in

GRINDING MEDIA

GRINDING BALLS
STAMP MILL SHOES & DIES
GRINDING SLUGS & MILL RODS

FORGINGS FOR

MILL ROLLS
DIESEL ENGINES
TURBINES
GEARS & PINIONS
MARINE & INDUSTRIAL SHAFTING
PIPE FLANGES

PRESS FORGED BARS & BILLETS

DROP FORGINGS

FORGINGS MADE TO
CUSTOMERS' SPECIFICATIONS



"AMERICAN"

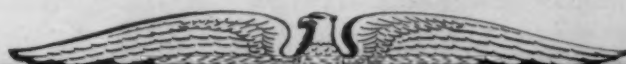
Rol-forged Steel

(Heat Treated)

GRINDING BALLS

have what it takes!

...and it takes a lot—crushing ore and pulverizing rock is no sissy job. In a ball mill, grinding balls take a lot of punishment. To serve Western mining and cement operations we have made a specialty of grinding balls and "AMERICAN" Grinding Balls are doing a fine job everywhere. By our Rol-forged method the grain structure and fibre flow of the carbon steel are concentrated to give super strength the balls are then heat treated to give them greater hardness "AMERICAN" Grinding Balls are made to give longer service. We make balls from $\frac{3}{4}$ inch to 6 inches in diameter. Let us know your requirements and we will be glad to quote prices.



AMERICAN FORGE COMPANY

BERKELEY, CALIFORNIA



AMERICA IS *Built with Aggregate!*

New Life for 350,000 more Americans

Cedarapids

Built by
IOWA

THE IOWA LINE

of Material Handling Equipment
Includes

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS — STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING
SCREENS
STRAIGHT LINE ROCK AND
GRAVEL PLANTS
FEEDERS — TRAPS
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

New power for new farms, new industries, villages and cities, water for more than a million thirsty acres—all this is made possible by 15,000,000 yards of aggregates which are the basic ingredients of mammoth Grand Coulee Dam. Even more fundamental, specially where the contractor is concerned, is the cost of producing aggregates for dams like this, or for highways, airports, industrial or residential building. The difference of even a few cents a ton, on the cost of producing that aggregate, may mean the difference between profit and loss or between getting the contract or not getting it.

Tomorrow's construction projects hinge on low cost aggregates! IOWA, devoted exclusively to the manufacture of Cedarapids equipment, will be more than ever Headquarters for aggregate producing equipment for the boom periods that lie ahead.

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA



In the Shops and On the Skyways—
In the Mines and On the Highways...



1894-1944 Pioneers for 50 Years

For half a century, The Cleveland Pneumatic Tool Company has devoted itself to serving many major industries.* Skilled technicians and experienced engineers within our organization have pioneered and perfected many products for each of these fields. Thus initiative and resourcefulness have enabled us to keep abreast of this country's remarkable industrial progress... We are commemorating our golden anniversary by continuing to put all our talents and energies in the fight to preserve the American way of life. We are proud to have grown with our nation for 50 years, and look forward to serving in the great future that lies ahead.

Buy U. S. War Bonds and Stamps

**CLECO Pneumatic Tools speed production in metal-working plants. AEROLS (the shock absorbing landing gear used so universally on aircraft) insure safe, smooth landings and take-offs. CLEVELAND Rock Drills are widely used in the mining and contracting fields. CLE-AIR Shock Absorbers protect buses, trucks and trailers from road shocks.*

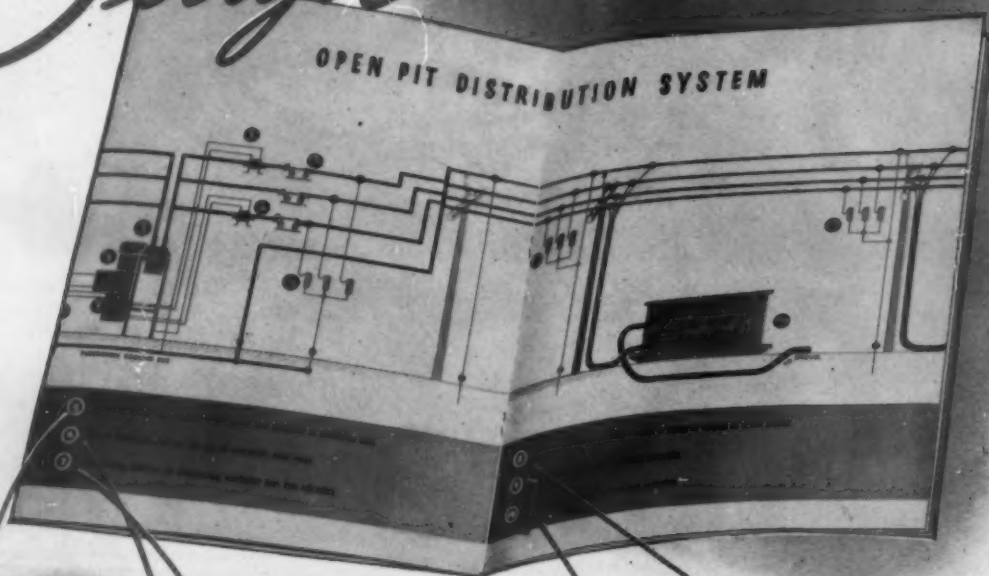
★ THE CLEVELAND PNEUMATIC TOOL COMPANY ★ ★ AND SUBSIDIARIES ★

★ THE CLEVELAND ROCK DRILL DIVISION ★

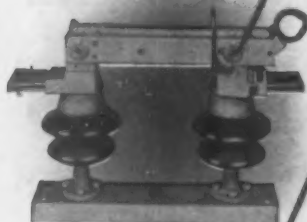
★ CLEVELAND PNEUMATIC AEROL, INC. ★

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Design FOR SAFETY AND RELIABILITY



Type FO-22-A Outdoor Oil Circuit Breaker.



Type LCO Disconnecting Switch

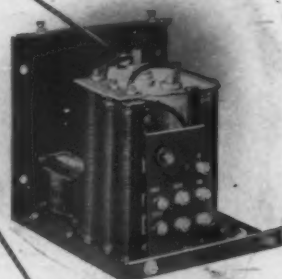


Type WO-15 Current Transformer

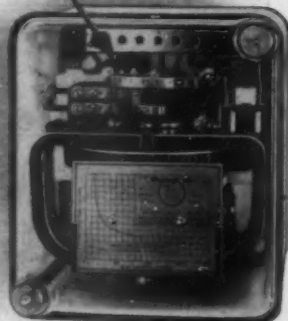
In open-pit mining, there is only one way to assure peak production with complete safety for your employees. Be sure your distribution system has been *designed* to include *every* factor for safety and reliability.

Perhaps your present system is entirely adequate. But it will pay you to check it against accepted standards. Usually, adequate protection can be secured with few changes. Additional equipment may not be necessary—or a few inexpensive protective devices may turn the trick.

To help you in determining whether or not your present system needs a thorough check-up, Westinghouse has prepared a new book on the important subject of open-pit distribution systems. It explains the equipment needed for safety and reliability—and tells why. Complete diagrams, like the one illustrated above, clearly show the advantages you get with the correct equipment. Write today for your copy of B-3282. And if you need the additional help of our engineering staff, just call our nearest office. You'll get their immediate co-operation. Westinghouse Electric & Manufacturing Company, Dept. 7-N, East Pittsburgh, Penna. J-94610



Capacitor Trip Device with cover removed.



Type CO Over-current Relay.

Westinghouse
PLANTS IN 25 CITIES... OFFICES EVERYWHERE



Electrical Equipment for the Mining Industry

Even the best wire rope—alone— isn't enough. The buyer of rope for the vital war job of today and the cost-conscious job of tomorrow has a right to all that goes with good rope.



WHAT CAN YOU EXPECT from Roebling? Rope that has known capacity to deliver service. Engineering, in our plant and at your job, to put the rope to work right. Maintenance practices that protect its long life. ** Your postwar jobs and postwar profits will depend in part upon keeping rope-rigged equipment operating at lowest possible cost. You can leave that part to Roebling.

JOHN A. ROEBLING'S SONS COMPANY

TRENTON 2, NEW JERSEY • Branches and Warehouses in Principal Cities



ROEBLING

PACEMAKER IN WIRE PRODUCTS

Wire Rope and Strand • Fittings • Cold Rolled Strip • Aircord, Swaged Terminals and Assemblies • Round and Shaped Wire Wire Cloth and Netting • High and Low Carbon Acid and Basic Open Hearth Steels Suspension Bridges and Cables • Electrical Wires and Cables • Aerial Wire Rope Systems

MARCYS Grind Clinker

Faster

LOW DISCHARGE

DOES THE TRICK

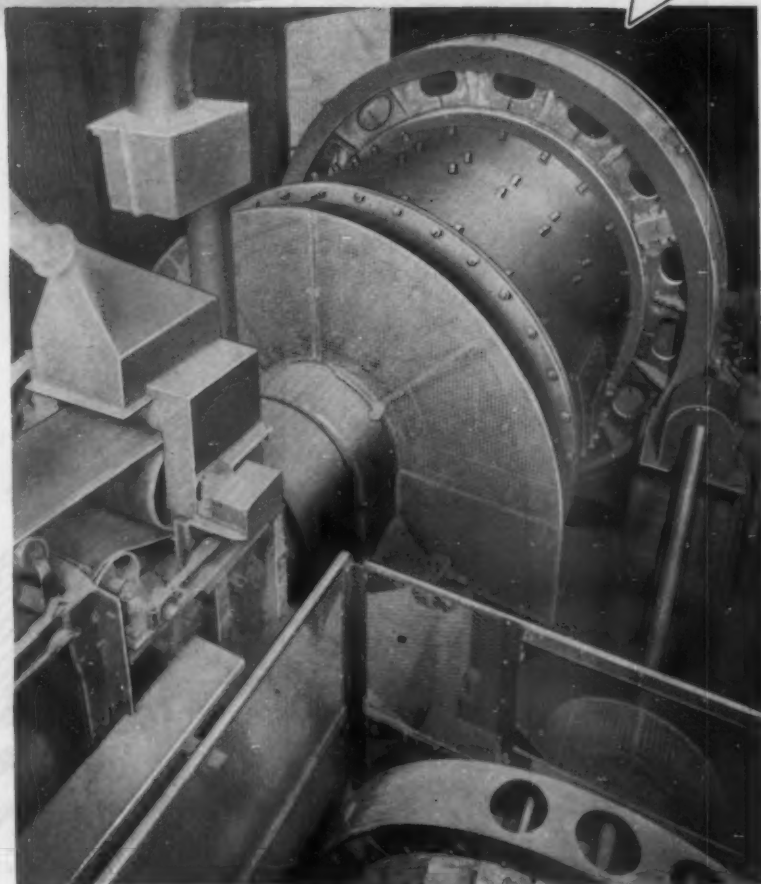
FOR thirty years certain advantages in design have made Marcy Mills outstanding in the grinding of metallic ores:

1. **LOW DISCHARGE**, made possible by Marcy's grated open end, effects quicker removal of finished material.

2. Due to quick discharge of material when finished, grinding balls work on a smaller body of material and are cushioned less — resulting in more useful work from the grinding media.

★ **FOR PRIMARY GRINDING OF CEMENT CLINKER OR RAW MATERIAL**, increased capacity and lower grinding cost per ton are obvious advantages.

"Mine & Smelter's" engineering staff would welcome an opportunity to discuss these factors with your consultants . . . Post-war construction **MUST** be a big job. Let's get ready for it.



Main Office: Denver, Colorado, U. S. A.
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Genuine Wilfley Tables, Massco-McCarthy Hot Millers, Rock Bit Grinders, Belt Feeders, Automatic Density Controllers — **LABORATORY EQUIPMENT, MINE & MILL SUPPLIES, COMPLETE MILLING PLANTS.**

The
Mine & Smelter
SUPPLY CO.

1,000 TONS per DAY

with Universal Standard 6 Unit Plant



Over 100 tons per hour, 1,000 tons per day—day after day—of ballast, mostly $1\frac{1}{2}$ " and 1", are being turned out at minimum cost for the Burlington Railroad at Wyalusing, Wisc. This plant, one of a number owned by E. C. Schroeder of McGregor, Iowa, consists of 6 standard units selected as most suitable for this railside quarry. Timber was used wherever possible to conserve metal. Output is up to the expectations of all concerned.

This plant, made up of 6 "packaged" units and arranged to provide a minimum of handling, includes: a 20" x 36" roller bearing primary jaw crusher of Universal's exclusive

light-strong Streamlined design; a 40" x 24" roller bearing star gear roll crusher for secondary reduction; 4' x 8' three deck gyrating screen; a 36" x 8' apron feeder with bar grizzly and by-pass (to by-pass fines around primary crusher); a 24" x 108' lattice frame conveyor from primary crusher to screen; and an 18" x 44' channel frame return conveyor. This is another case where soundly engineered standard units of the proper size selected from Universal's complete line were brought together to form an efficient, profitable plant. Probably we can do the same for you.

UNIVERSAL ENGINEERING CORPORATION

(Formerly
Universal Crusher Co.)

617 C Ave. West,
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UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS



Jaw Crusher



Roll Crusher



Gyrating Screen



Log Washer



Scrubber Screen



"Lattice" Conveyor



Mechanical Feeder



Sand Screw



Steel Bin



Rotator



V-Belt Drive



Revolving Screen



Pulverizer



Bucket Elevator



Apron Feeder



Sand Tank

Here are
5 TYPES
of
GATES V-Belts



- Which Type Best Fits **YOUR Needs?**



**Your Gates FIELD ENGINEER Can Tell You
PHONE Him TODAY!**

Whenever a drive in your plant is wearing out belts faster than it should—or is giving any other trouble—just pick up your phone and call the Gates Field Engineer.

He can quickly analyze your problem and, in most cases, he can correct the trouble very easily without needing to specify the use of any special-structure belts.

In some installations, however, belts having special characteristics will prove to be the most efficient and economical that you can use. For example, a V-belt with tension members composed of rayon cords will, in some installations, have advantages over the standard cotton cord construction.

Again, Static-Safety V-belts may best fit your special needs—or V-belts with tension members composed of flexible steel cables may be the most efficient and economical despite their higher initial cost.

Outstandingly, the Gates synthetic rubber V-belt—which has been in extensive use for more than 6 years now—is piling up amazing service records. Under severe conditions of oil and heat, the Gates special synthetic belt actually wears 2 times to 3 times as long as any natural rubber belt!

To find out which particular type of V-belt will serve YOU best involves no more effort than merely picking up your telephone directory and calling the number there listed for your Gates Field Engineer. He will know the type of V-belt it will pay you best to use—and he will always recommend the practice that will be most efficient and economical for you.

THE GATES RUBBER COMPANY
Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

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Old Friend of the Outfit

Pulling a jeep out of a submerged shell hole while under enemy fire takes plenty of you-know-what. True, it's only one of hundreds of jobs an invasion force may be called upon to do. And, it's just one of scores of ways in which good, dependable wire rope comes in mighty handy.

On the far-flung battlefronts—and at home, too—men of action know that even under the most adverse conditions they can count on the performance of Wickwire Rope.

Right now we are making more rope than ever before—but it has

more jobs to do in more places. It's smart to take good care of the rope you now have so it will last longer and so our fighting forces can have more for *their* work.

Proper selection, application and usage of wire rope will make it pay dividends in longer life and higher production. Write for a copy of our free book "Know Your Ropes." And, if you have a wire rope question, we'll be happy to be of service. Write Wickwire Spencer Steel Company, 500 Fifth Ave., New York 18, N.Y.



HOW TO CONSERVE WIRE ROPE

Thousands of wire rope users—old hands and new—have found "Know Your Ropes" of inestimable value in lengthening life of wire rope. Contains 78 "right and wrong" illustrations, 40 wire rope life savers, 20 diagrams, tables, graphs and charts.

SEND FOR YOUR FREE COPY

Send your wire rope questions to:



WICKWIRE SPENCER STEEL COMPANY



500 FIFTH AVENUE, NEW YORK 18, N. Y.

Abilene • Buffalo • Chattanooga • Chicago • Detroit • Houston • Los Angeles • Philadelphia • San Francisco • Tulsa • Worcester

ROCK PRODUCTS, June, 1944

Uniform **MOISTURE**

In Washed Sand for Concrete

CUTS TIME & COST

in mixing



Control
the moisture with

AKINS *Classifiers*

WHEN you talk business to large users of sand for concrete there's a tremendous sales advantage in being able to say that you can supply sand of uniform moisture content — and make it stick. Every contractor knows that moisture content of sand either causes variation in tests or adds time and cost in mixing — or both.

AKINS Classifiers, long identified with the dressing of practically all metallic ores, are finding increasing favor in sand washing because they are mechanically adapted to **CONTROL OF MOISTURE**. AKINS Classifiers are also particularly suited to washing sands specified to close separation, as for glass making.

AKINS Classifiers do not require unloading to start after shutdown. This is particularly advantageous for sand plants not operating 24 hours a day. Considering their high tonnage output, power requirements are absurdly low.

In writing for further information, please state your washing problem.

We also manufacture:

SKINNER MULTIPLE HEARTH ROASTERS; LOWDEN DRYERS; BALL, ROD & TUBE MILLS; SMELTING EQUIPMENT; CRUSHERS & ROLLS; DIAPHRAGM PUMPS.

**COLORADO
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Head, Wrightson & Co., (So. Africa) Ltd., Johannesburg
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MAIN OFFICE & WORKS: DENVER 2, COLO., U. S. A.



“THIS

is synthetic rubber”

“AND *so is this”*



SERVING THROUGH SCIENCE



One is a raw material...the other a finished synthetic rubber conveyor belt, made by United States Rubber Company for tough wartime service. Between the two lies a wealth of applied scientific knowledge, technical skill and compounding experience.

For years we have been making conveyor belts with synthetic rubber for special installations. This was in keeping with our policy to design and build each conveyor belt to meet the specific conditions involved.

Now that synthetic rubber is a “must” for all conveyor belts this policy continues...every U.S. Conveyor Belt is engineered to meet all physical and chemical forces encountered in its individual conveying job—also to have the essential characteristics of flexibility, for proper troughing, and perfect alignment.



THEY'RE FLEXIBLE—THEY TROUGH—THEY'RE ALIGNED...Hundreds of thousands of feet of U.S. Rubber Conveyor Belting are helping today to handle ore, coal, limestone and many other types of bulk material used in the manufacture of America's war products.

Listen to the Philharmonic-Symphony program over the CBS network Sunday afternoon, 3:00 to 4:30 E.W.T. Carl Van Doren and a guest star present an interlude of historical significance.

UNITED STATES RUBBER COMPANY

1230 SIXTH AVENUE, ROCKEFELLER CENTER, NEW YORK 20, N. Y. • In Canada: DOMINION RUBBER CO., LTD.

ROCK PRODUCTS, June, 1944

Reversing THE RULES OF NATURE

This Conveyor carries materials down hill in controlled capacities...despite varying densities

... and again Robins engineering conquers a difficult problem.

It seems that Robins is expected to make difficult problems simple. At least, the record of materials handling problems put to us might indicate this to be the fact.

One recent case was typical. A mining company told us that the ores on its property had quite a range of density—variances in the weight per cubic foot ran as high as 30% between the lightest and the heaviest. There was no way of controlling the materials at the source; a run of the lightest ores might change into the heaviest suddenly and without warning.

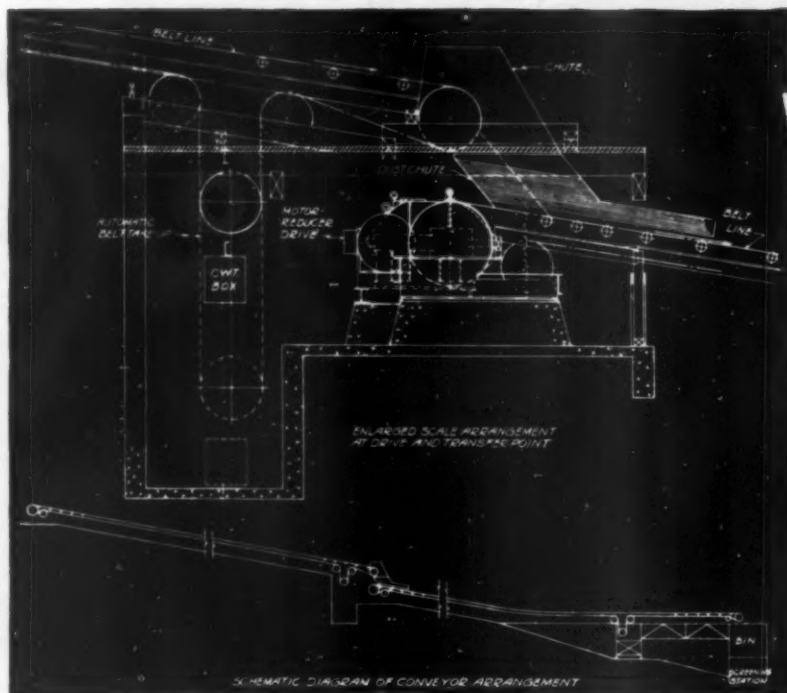
The company wanted us to design a Belt Conveyor system that would carry these ores down hill at a specified tonnage per hour, regardless of the weight per cf of the material at any one moment. It had to be done without over-

loading the Belt—and without losing control of the ores due to gravitational pull.

It was done. The Belt Conveyor system is quite elaborate, six of the Conveyors being 1000 feet or more in length. The entire project was designed by Robins engineers, manufactured in the Robins plant. Your Conveyor problem may be simpler—or even more complex. Regardless of its difficulties, regardless of its size, you will get eminently more mental satisfaction and productive efficiency if you turn the matter over to Robins. For Robins originated the method of

conveying with a rubber belt, originated the troughing of belts—originated many other materials handling methods and machines in common use today. Isn't it logical that the company with the longest experience should know most about how to do these things best?

Whatever your needs in Belt Conveyors—or other materials handling machinery—get in touch with Robins. A Field Engineer from the nearest of our ten offices will be glad to consult with you—free of cost or obligation. Please address your letter to Dept. R. P. 6.



ROBINS makes: BELT CONVEYORS • COAL AND ORE BRIDGES • BUCKET ELEVATORS • CAR AND BARGE HAULS • CAR DUMPERS • CAR RETARDERS • CASTINGS • CHUTES • CONVEYOR IDLERS AND PULLEYS • CRUSHERS • FEEDERS • FOUNDRY SHAKEOUTS • GATES • GEARS • GRAB BUCKETS • PIVOTED BUCKET CONVEYORS • VIBRATING SCREENS • SCREEN CLOTH • SELF-UNLOADING BOAT MECHANISMS • SKIP HOISTS • STORAGE AND RECLAIMING MACHINES AND SYSTEMS • TAKEUPS • LOADING AND UNLOADING TOWERS • TRIPPERS • WEIGH LARRIES • WINCHES • WINDLASSES

FOR MATERIAL AID IN MATERIALS HANDLING **It's ROBINS**

ENGINEERS • MANUFACTURERS • ERECTORS

**ROBINS
CONVEYORS**

INCORPORATED

Founded in 1896 as Robins Conveying Belt Co.

PASSAIC • NEW JERSEY

MATERIALS HANDLING MACHINERY

Making Association Activity Profitable

LIME is a chemical raw material of almost limitless potentialities that affords an extensive and most interesting field for research. The future undoubtedly will reveal, through research, many new facts of practical value to producer and consumer alike. Certainly, some of the properties of limes and the effects of those properties in usage have been little understood to date.

At the May open meeting of the Board of Directors, National Lime Association, some extremely informative reports were read on research being conducted under the auspices of that Association at Massachusetts Institute of Technology, the University of Illinois and at the U. S. Bureau of Standards. The nature of the studies (see report in this issue) and the caliber of the scientists performing the work are outstanding. It takes organization, and the support of interested members, to make possible work of this kind. And it will require greater backing to expand the research activities sufficiently to extend markets and develop new outlets for post-war years.

The industry has a job on its hands to regain building lime markets that have been seriously reduced by the inroads of competitive materials. And, we might ask, how is the shock of an anticipated sharp reduction in the tonnage of chemical lime at the close of the war to be offset? Research, applied to practical usage, is certainly a course to follow.

Yet, despite its accomplishments through research in widening markets, the Association can boast of only 39 member concerns that produce something like one-third the national tonnage of lime. The membership is concerned, and rightly so, since they have been supporting work that has benefited the entire industry. Furthermore, they desire to undertake a broadened program of activity in the face of a changing future.

The unanswered question at the meeting was why more members could not be secured. It was suggested, as basic, that the Association must be in a position to render service that cannot be secured elsewhere by producers of lime. That is true, of course, since any commodity must have value to be desired.

Selling the Association

The National Lime Association is accomplishing much useful work that cannot be duplicated from any other source, so the answer appears to be one of promotion and merchandising and, we might add, presenting research data in such a way that new services are rendered in doing so.

Lime is a product with popular appeal possibilities that could be exploited by a publicity program of national scope. Yet, there has been very little done to arouse public interest.

Take, for example, the Victory garden. Something like 20,000,000 Victory gardeners depend for information principally on seed stores and articles they read

in magazines like *Better Homes and Gardens* or *American Home*. The seed store man seldom will suggest that they buy lime but he will extol the virtues of other commercial fertilizers. And it is very seldom that magazines of the class mentioned publish articles that tell the gardener what lime really does for the soil.

If the gardener (or farmer) could read articles that show him that lime can be used to advantage on most soils as a fertilizer that will also release other minerals to vegetable roots, as well as an acid neutralizer, the chances are that he will ask his seed man for a package of lime. It seems that an Association, with its research experts, should set itself up as the authority on its own products and have its staff or members prepare articles of the type suggested.

To mention an example, a recent article by Dr. William A. Albrecht, chairman of the Soils Department, University of Missouri, that appeared in a farm magazine was considered one of his most effective sales tools by an agricultural limestone producer who called our attention to the article.

Informative Articles Needed

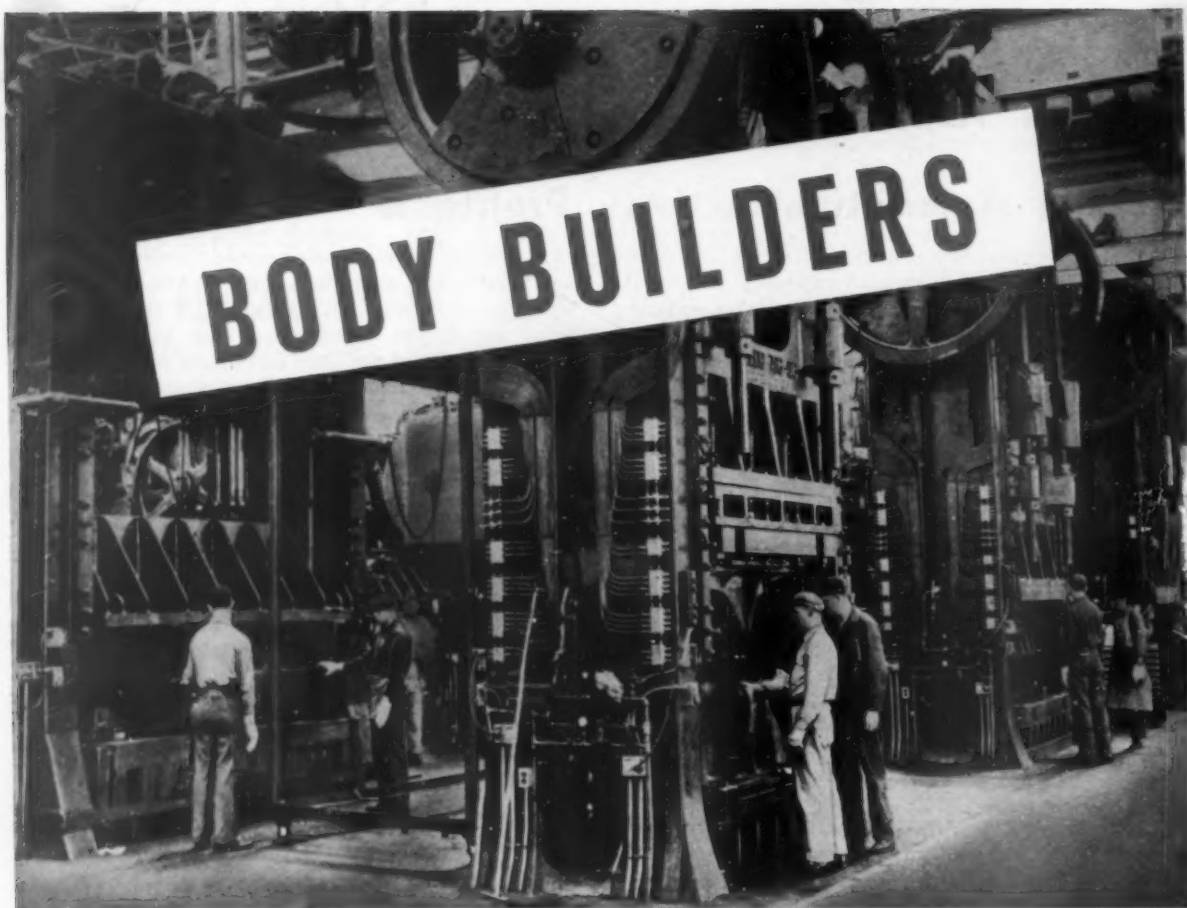
Informative articles on new uses or new developments in lime could well be publicized in other media. The *Wall Street Journal*, a paper widely read by business executives, frequently carries such articles on various commodities.

It strikes us that much of the research being reported is possibly over the heads of some small producers and prospective consumers, because of the nature of the studies, and a skilled coordinator could digest and interpret the various studies into their practical aspects before wide presentation is made. Such material could be published or printed on promotional pieces which could be purchased at cost by producers for distribution on their own letterheads to prospective customers.

A suggestion, made in the meeting, was to conduct schools for company sales personnel in order to acquaint them with properties of the product they sell. This practice isn't new, by any means, but it is a good idea and has been effectively used.

We have merely tried to make a few suggestions. We know the National Lime Association to be a very worthwhile enterprise that merits support and we want to see it prosper. Every lime producer should get behind its industry.

Bror Nordberg



WHILE truck-bodies made on huge presses these days are mostly for military use, the civilian fleet operators will get a 1944 allotment of 88,000 vehicles, which is only a trickle compared to peacetime production. This points to the need for taking extra care of your present equipment.

Faced with this problem, fleet operators everywhere are learning from experience that they can offset much of the added wear of wartime loads and schedules by lubricating with *Texaco*.

Texaco Marfak, for example, provides a tough, adhesive film that cushions chassis parts against road shocks and protects them against road splash. This unusual product provides ideal

film lubrication inside a bearing, yet maintains its original consistency at the outer edges . . . sealing itself in, sealing out grit and water.

For wheel bearings, use *Texaco Marfak Heavy Duty*. It stays in the bearings—assuring safer braking. No seasonal changes required.

Texaco lubricants have proved so effective in service that they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available to you through more than 2300 *Texaco* distributing points in the 48 States.

★ ★ ★

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with *Texaco* than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with *Texaco* than with any other brand.

★ More revenue airline miles in the U. S. are flown with *Texaco* than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with *Texaco* than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with *Texaco* than with any other brand.



TEXACO MARFAK

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

★ ★ ★ Washington NEWS

WAR contractors and subcontractors were warned by Laird Bell, vice-chairman of the War Contracts Price Adjustment Board, that they must file on or before June 1, 1944, standard forms of reports required by the Renegotiation Act of 1943. Failure to comply with this mandatory provision of the act subjects contractors to a fine of \$10,000 or two years in jail. The Act does not give the War Contracts Board any authority to grant extensions of time for filing these reports.

Agencies to which the act applies are the War, Navy and Treasury Departments, the Maritime Commission, the War Shipping Administration and four subsidiaries of the Reconstruction Finance Corporation, Defense Supplies Corporation, Defense Plant Corporation, Metals Reserve Co., and the Rubber Reserve Co.

The standard forms, made available in April, must be filed on or before June 1, 1944, in the case of contractors whose latest fiscal years closed prior to March 1, 1944, and on or before the first day of the fourth month following the close of the fiscal years of contractors whose fiscal years close on or after that date.

No Release on Building Materials

Denial has been made by W.P.B. and N.H.A. of rumors that the War Production Board will soon issue priorities and release building materials for a partial resumption of normal private housing construction.

The statement on relaxation of materials for building construction was attributed to L. H. Keyserling, general counsel of N.H.A., who appeared recently before the House Public Buildings and Grounds Committee and obtained an approval of an amendment to permit the use of Lanham Act funds in processing applications made for housing other than for occupancy by war workers. This amendment merely permits the use of these funds for processing priority applications of individual "hardship" cases the administration of which was recently transferred from W.P.B. to N.H.A., as well as applications under a program to relieve general hardship and congestion in certain areas when and as materials for this program became available. Mr. Keyserling did not make any statement as to the time when normal housing construction will be resumed or to its extent, decisions for which

rest entirely with the War Production Board, the agencies said.

Ready Mix and Concrete Products Price Control Change

New methods for pricing have been provided manufacturers of ready mixed concrete, concrete products, and precast stone products which were not sold or offered for sale during March, 1942, and for which ceiling prices have not been established, the Office of Price Administration announced on May 19. The changes are provided for under Amendment No. 36 to Order No. A-1 under Section 1499.159 of M.P.R. No. 188.

Effective May 19, the new pricing method will establish prices for these products in line with the general level for similar products, and supersedes the four pricing methods previously provided, thus simplifying both pricing and reporting procedure.

Three separate categories are set up:

(1) Ready-mixed concrete, whether mixed during transit or prior to delivery to job-site; (2) manufactured items not cast in place, including cement and concrete building blocks and brick; cement and concrete tile and tiling; sewer, culvert, and other concrete pipe; concrete drain tile; concrete posts; silos and cribbing; precast concrete floor, roof, and wall slabs; terrazzo; concrete septic tanks, laundry tray and shower stall bases; and concrete grave vaults and (3) precast stone products used in place of natural stone or to obtain an ornamental architectural effect.

The new pricing method affords provisions applicable to the three general types of conditions confronting manufacturers of the products as follows:

(1) The case of a plant operating in March, 1942, and now selling a product not sold or offered for sale in March, 1942, but which could have been priced on the basis of a then existing formula or pricing practice. In these cases, it is now provided that the price to a purchaser for a particular product not sold or offered for sale during March, 1942, shall be in an amount not in excess of what it would have been to such purchaser under normal conditions of sale during that month. This price will be based upon the price, pricing practices, freight rates, transportation practices, trade practices, terms of sale and allowances, and customary differentials most favorable to purchasers in effect during March, 1942.

(2) The pricing of new products not sold or offered for sale in March,

1942, by either a new plant or a plant operating in March, 1942, but lacking an established pricing formula.

The price in this case will be the maximum price of the most competitive seller, based on the following factors: comparable kind, grade, and quality of the commodity being priced; class of purchaser; and class of seller. Details of competitive prices used must be reported to O.P.A.

(3) The pricing of products produced and sold by a temporary plant.

For a sale from a temporary plant which cannot be priced on a competitive basis, a formula is provided by which the ceiling price will be the manufacturer's price for the same product under similar conditions of sale out of his own permanent plant, adjusted to reflect the difference in cost at the temporary plant. Details of competitive prices or costs, as the case may be, must be reported to the O.P.A.

In the event that the maximum price of a particular product cannot be determined under the above provisions, or if the fixing of a price under these conditions would result in hardship to the seller, application for approval of a ceiling price must be made to O.P.A.

Limitation on Plastering Bases

Provisions governing the use of metal plastering bases and metal plastering accessories have been removed from Order L-59-b as amended recently by the War Production Board. The permitted uses of these items for war housing are set forth in the War Housing Critical List (Schedule 1 of Order P-55-c, as issued in February, 1944. For other construction requiring authorization under Order L-41, permitted uses are now listed in Controlled Materials Plan Regulation 6, Schedule A, Construction Limitations.

Order L-59-b formerly prohibited the manufacture of any metal lath and accessories for any use except for the military and for a few specified industrial purposes. As amended, the order imposes specified weight limitations on the manufacture of the following items: expanded lath, ribbed lath, wire stucco mesh, cornerite or stripite from expanded lath; and small nose corner bead and base screed. The sale of metal lath and accessories is restricted to purchase orders bearing preference ratings of AA-5 or better, and to orders amounting to \$5 or less. Orders may not be divided to come within this \$5 limit.

(Continued on page 126)

Nitro Starch Base

High Explosive Efficiency

IN MINING • QUARRYING • LOGGING AND CONSTRUCTION

Plus THREE ADVANTAGES FOR YOU!



WILL NOT PRODUCE HEADACHES from handling . . . reduces discomfort from breathing muck pile fumes. Better working conditions for you and your men!

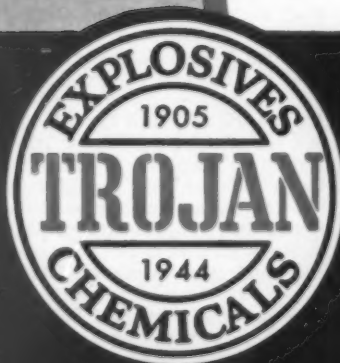


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Rocky's NOTES

A SUBJECT intended to be discussed in our Annual Review issue of last January was Enemy Alien Patents which are available to American citizens on payment of a small fee. The way to obtain a license is through the Office of Alien Property Custodian, Washington, D. C. The fee is a small one—\$50. A copy of the patent specification can be obtained from the Commissioner of Patents, Washington, D. C., for 10c per copy. Last year we picked out about 150 of these that seemed from their titles to be interesting, and this is the first opportunity available to describe some of the most interesting ones.

Even though the reader may not be sufficiently interested to follow through, we think that abstracts of some of these patents will prove interesting and thought provocative. For instance, in view of the developing use of calcium carbonate for addition to live-stock feed, and even for fortifying flour and vitamin pills, we find this Japanese patent quite interesting:

Colloidal Calcium Carbonate

No. 1,654,099, PATENTED, Dec. 27, 1927, by Tsuneji Shiraishi, for making colloidal calcium carbonate. The process consists of treating milk of lime (a suspension of calcium hydroxide— $\text{Ca}(\text{OH})_2$ —hydrated lime) in water with the addition of carbon dioxide gas (CO_2) at a temperature below 15 deg. C. and under pressure. It is well known that the addition of CO_2 to milk of lime will convert the $\text{Ca}(\text{OH})_2$ to the carbonate CaCO_3 , which is precipitated. This is the ordinary method employed to make precipitated calcium carbonate. But calcium carbonate is relatively insoluble in water. The calcium carbonate that does remain in solution is the bi-carbonate, and this does not exist except in a dilute solution. It is also known that cold water will carry more CaCO_3 in solution than warm water, and that pressure will increase the solubility.

The Jap inventor claims that by many experiments he has found the right proportions of milk of lime, temperature, and CO_2 pressures to put the maximum amount of CaCO_3 into solution—this is the colloidal calcium carbonate. However, it is also well known that as soon as the pressure is released and temperature raised the colloidal calcium carbonate, or rather the so-called bicar-

bonate, will revert to the crystalline precipitate CaCO_3 . So he adds a protective colloid to the solution of carbonate, and it jels as colloidal CaCO_3 . It can then be dried and handled, and all that is necessary to use it in colloidal solution is to add water, or it can be used in the protective colloidal form in feed stuffs and pharmaceutical preparations (vitamin pills for example).

The protective colloid may be glue, gelatin, casein, gum arabic, agar-agar, soluble starch, etc., added in about 10 to 30 percent of the colloidal CaCO_3 . These protective colloids, as colloid chemists well know, will prevent the crystallization of the CaCO_3 , and some of them are obviously food or drug products used in food preparation.

It is not unlikely that some of the food and drug products now being widely advertised as containing calcium are made with this colloidal CO_3 , but the U. S. Government grants no one a monopoly in the use of these alien patents. The lime manufacturer is in a preferred position to produce this product because he has plenty of CO_2 going to waste and certainly plenty of lime. It is probable that he would have to make a practically pure CaO and thoroughly clean his CO_2 gas, but this is possible, and of course the tonnages treated would be small. Nevertheless here is an edible lime product worth looking into.

Make White Cement a New Way

No. 1,865,418, PATENTED June 28, 1932, by Gustav Bergen, Felix Engelhardt and Richard Steckhan and assigned to the "Miag" corporation, Brunswick, Germany, for a process of manufacturing white portland cement. This process is for making white portland cement from clays or shales containing iron oxide and other impurities which give ordinary portland cement its dark color. Instead of attempting to get rid of these clay impurities, the process adds phosphates or borates which form colorless reaction products or

melts, which result in a white clinker, in the ordinary process of burning in a rotary kiln.

The process description states: "The quantity and character of the phosphates or borates to be added to the powdered raw materials depends on the amount and character of the coloring matter contained therein. Further, it has been found advantageous in a good many instances to use a temperature-reducing (fluxing) agent, such as fluorspar, together with the phosphate and borate." Sodium phosphate and borax are the phosphate and borate generally used, it appears.

The phosphates and borates are said to form inert glasses in the calcination process, and these ground with the clinker are colorless and constitute but a small percentage of the finished cement.

The raw materials for this process are plentiful in the United States. Indeed, the Geological Survey officials of Illinois and the southern Illinois fluorspar producers are worrying about post-war outlets. We have known of instances in this country where fluorspar was added to a white portland cement mix to lower the sintering temperature. The result is said to have been a "pink" not a white cement. However, cement plant research chemists could have some fun working on this German process.

No. 2,201,143, PATENTED May 21, 1940, by Otto Schwachheim, Germany, also describes a process for making white portland cement from clays containing coloring oxides. Here chloride of lime is added to the raw material mix and the calcining is done in a reducing atmosphere (less air than required for complete combustion), and the clinker is cooled while excluding air. A fluorspar flux may also be added, although it is said not to be necessary. Selenium in the raw materials reduces the amount of calcium chloride required.

To use this process obviously would require changes in the ordinary methods of burning and cooling cement clinker, although there have been cement chemists who advocated a reducing atmosphere in cement kilns as an aid to clinkering.

There seems little doubt, that in view of the popularity of cement products for architectural structures, there will be an increasing demand for white or very light colored cements. Consequently, it is presumed many cement chemists are working on the problem. The two German patents described above may furnish some clues.

Nathan C. Rockwood



B&W ELVERITE TUBE MILL CASTINGS

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These advantages are of great importance with the present-day critical manpower situation, and they will be of equally great importance from the standpoint of economical operation in the post-war period.

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C-55

Named Asst. Director, Bureau of Mines

GEORGE A. LAMB, former chief of the Economics and Statistics Division of the Solid Fuels Administration for War, has been appointed to the newly created post of assistant director of the Bureau of Mines. This announcement was made by Secretary of the Interior Harold L. Ickes, who revealed at the same time that virtually all activities of the Economics and Statistics Division of the S. F. A. have been transferred to the Bureau of Mines. Dr. R. R. Sayers, Bureau director, said that Mr. Lamb, because of his administrative ability and professional skill, will manage the administrative planning and budgetary work of the Bureau. Mr. Lamb, who is 38 years old, has had a varied career in Government service, having seen duty with the Department of Agriculture, the National Recovery Administration, the National Bituminous Coal Commission, the Interstate Commerce Commission, and the Bituminous Coal Division. A native of Pocatello, Idaho, he attended grade and high schools there and was graduated from the University of Portland (Ore.) with a bachelor's degree in economics in 1929. In 1932, he attended Yale University under a Strathcona Memorial fellowship and specialized in studies of bituminous coal freight rate structures. He was awarded a Master of Arts degree in Transportation. He also enrolled in graduate work at the University of Michigan in 1932-33 and was a teaching fellow at the University.

Reelected C. of C. Head

ERIC A. JOHNSTON, chairman of the Board, Washington Lime and Brick Co., Spokane, Wash., has been re-elected president of the Chamber of Commerce of the United States.

In the Navy

WILLIAM C. MASON, part owner and manager of the Ohio Asphaltic Limestone Co., Inc., New Vienna, Ohio, has been commissioned a Lieutenant (j.g.) in the U. S. Naval Reserve.

On Board of Directors

HOWARD MANSUR, production manager of the Washington Brick and Lime Co., Spokane, Wash., has been elected to the board of directors of the company. Re-elected officers are Eric A. Johnston, chairman of the board; Neal Fosseen, president, who is serving in the Marine Corps in the Pacific; Vernon B. Kelsey, vice-president; and Ernest Frank, secretary-treasurer. Re-elected directors

are Eric A. Johnston, Neal Fosseen, Charles P. Lund, Ernest Frank, William Rath, Vernon B. Kelsey and William Coleman.

A.S.T.M. Nominees

P. H. BATES, chief, Clay and Silicate Products Division, National Bureau of Standards, Washington, D. C., has been selected by the Nominating Committee of the A.S.T.M. for president of the Association. Arthur W.



P. H. Bates

Carpenter, manager of testing laboratories, The B. F. Goodrich Co., Akron, Ohio, was nominated vice-president. The following members were nominated for members of the executive committee: W. C. Hanna, chief chemist, California Portland Cement Co., Colton, Calif.; L. B. Jones, engineer of tests, Test Department, The Pennsylvania Railroad Co., Altoona, Penn.; J. T. MacKenzie, chief metallurgist, American Cast Iron Pipe Co., Birmingham, Ala.; J. G. Morrow, metallurgical engineer, The Steel Co. of Canada, Ltd., Hamilton, Ontario, Canada; and Sam Tour, president, Sam Tour and Co., Inc., New York, N. Y.

Woman Vice-President

MRS. ADDA M. McMILLIN, wife of Paul H. McMillin, president of the Roche Harbor Lime and Cement Co., Roche Harbor, Wash., has been made a member of the board of directors and elected vice-president of the company.

Road President

J. REID CALLANAN, vice-president and general manager of the Callanan Road Improvement Co., South Bethlehem, N. Y., has been elected president of the company.

P.C.A. Engineer

W. WAYNE WALLACE, office and field engineer for the Portland Cement Association, Chicago, Ill., has been appointed district engineer in charge of the Chicago office, with headquarters at 33 West Grand Ave. He will have charge of Association activities in the State of Illinois. Mr. Wallace joined the Association staff in 1924 and has been continuously employed by the Association since that time with the exception of a three year period when he was engaged in engineering sales work. He is a graduate of the University of Illinois, past president of Illinois Society of Engineers, a member of the Western Society of Engineers and the Chicago Engineers Club.

Named General Counsel

JOHN H. McNATT has been appointed general counsel of the Missouri Portland Cement Co., St. Louis, Mo. During 1942 and 1943 Mr. McNatt served as assistant director of industrial relations with the Atlas Powder Co. at the Weldon Spring, Mo., plant. Recently he was an enforcement attorney for the Office of Price Administration.

Cement Consultant

LEWIS A. PARSONS, traffic manager, Calaveras Cement Co., San Francisco, Calif., has been appointed as consulting engineer.

Goes to Puerto Rico

THOMAS F. MULLAN, about whom a personality item appeared in the May issue, is now technical supervisor and consultant for the Puerto Rico Cement Corp., Guaynabo, Puerto Rico.



Thomas F. Mullan

Name Given to Ship

MAJOR EDWIN C. ECKEL, late president of the Dominion Cement Co., and former T.V.A. chief geologist, will have his name assigned by the Maritime Commission to one of the self-propelled concrete vessels under construction by McCloskey & Co., Tampa, Fla. Major Eckel's name will go on the vessel because of the important part he played in the development of concrete. He was special commissioner in charge of cement exhibits at the Jamestown Exposition in 1907 and had written a number of books on cement in addition to geological and engineering treatises.

Publicity Director

ARTHUR STOUT has been appointed publicity director of the National Mineral Wool Association. Mr. Stout was formerly with the Copper Recovery Branch and Regional Redistribution offices of the War Production Board, New York, N. Y. Prior to his war activities, he was engaged in publicity and marketing study work with Frank Stout & Son. For a number of years, he was on the editorial staffs of the Eagle-News and Sunday Courier, Poughkeepsie, N. Y., newspapers. In his new position, Mr. Stout will work actively on the Association's program to aid the 1944-45 Fuel Conservation Drive.

Director of Research

H. D. RUHM, in addition to his duties as vice-president and general manager of the Ruhm Phosphate and Chemical Co., Mount Pleasant, Tenn., has been reappointed director of research. The company is resuming research on ground phosphate, which was discontinued in 1932, at several State Experiment Stations.

C.I.A. Member

ROWLAND BRYCE, controller of the Georgia Marble Co., Tate, Ga., has been elected to membership in the Controllers Institute of America. The Institute is a technical and professional organization of controllers devoted to improvement of controller-ship procedure.

Named Lime Director

SIDNEY B. CONGDON has been elected a member of the board of directors of the Kelley Island Lime and Transport Co., Cleveland, Ohio. Mr. Congdon is president of the National City Bank of Cleveland.

Air Fields Use Block

CONCRETE BLOCK has been used in various types of construction at Wright and Patterson Fields, Dayton, Ohio, on an unprecedented scale.

A painting contract recently negotiated by U. S. Army Engineers called

for the treatment of 225,000 sq. ft. of concrete masonry walls at Wright Field. A similar contract at Patterson Field will treat 335,000 sq. ft. of concrete wall space.

Close Cement Plant

UNIVERSAL ATLAS CEMENT CO., Independence, Kans., has been shut down with bins full, according to C. M. Carman, plant manager. The last shut-down for this plant was in October, 1941, so there has been a continuous 2½ year period of operation. Practically all of the plant production has been used in furnishing cement for war work. Mr. Carman, in announcing the closing, said that while the outlook for cement is not great for the duration of the war, all evidence points to a prosperous period of operation immediately following the end of the war with Germany. A considerable number of men will be kept busy for some time on repairs and maintenance work which has accumulated as a result of the long, uninterrupted operating period.

Start Up Lone Star Unit

LONE STAR CEMENT CORPORATION, Bonner Springs, Kans., has announced through Arnold Fairchild, plant superintendent, that the plant will start up operations. This plant was closed October 23, 1943. Difficulty in securing labor has been ex-

perienced by this plant as well as others in the Kansas area.

Kaiser Offers to Buy Yosemite Cement

YOSEMITE PORTLAND CEMENT CO., Merced, Calif., has received an offer from Henry J. Kaiser to purchase the plant. The Board of Directors have accepted the offer subject to approval by stockholders. In announcing the sale, the Board said that the decision to sell was dictated by the belief that abandonment of the Yosemite Valley Railroad is inevitable, resulting in loss of transportation of lime rock from quarry to the mill. While the closing date is indefinite, it is the opinion of officials that it will probably be in about three months.

Stockholders were told that liquidation of the company holdings would result in distribution to the holders of the preferred stock of an amount per share substantially in excess of the present market price (currently about 5½). The notice also said the directors held no hope that sufficient assets will be available for distribution to the holders of the class A or B common stock.

Big Gravel Contract

LOGAN COUNTY, Ohio, has awarded contracts for 40,700 tons of gravel costing \$36,160 for use in repairing 350 miles of county roads. The following companies participated in the awards: Western Ohio Stone Co., Huntsville; J. E. Osborn and Son, Bellecenter; Northwood Stone Co., Northwood; Ezra J. Neer, De Graff; Leslie Mohr, De Graff; C. N. Corbet, Zanesfield. The largest part of the awards went to Western Ohio Stone Co., for 7600 tons amounting to \$7910. As an example of the price range, the award prices to this company are listed as follows: 100 tons of quarry run stone 70c per ton; 100 tons of No. 1 and 2, 90c per ton; 200 tons of No. 34, \$1 per ton; 200 tons of No. 46, \$1 per ton; 3500 tons of Nos. 4, 6 and 7, \$1 per ton; 2500 tons of No. 6, \$1.10 per ton; 500 tons of No. 7, \$1 per ton; and 500 tons of No. 9, at \$1.20 per ton.

Reopen Sand Yard

THE NAPOLEON SAND AND GRAVEL CO., Napoleon, Ohio, is planning to resume operations after a shut-down of about a year, according to an announcement by Leo Eberwine, general manager. Docks and dredge boat machinery are now being repaired.

Bulk Cement Plant

THE KLINKER SAND & GRAVEL CO., Seattle, Wash., is constructing a concrete foundation for a bulk cement tank. The cost of this work will be about \$1200.

COMING CONVENTIONS

American Society of Mechanical Engineers, Semi-Annual Meeting, Pittsburgh, Penn., June 19-22, 1944.

American Society for Testing Materials, Annual Meeting, Waldorf-Astoria Hotel, New York, N. Y., June 26-30, 1944.

Concrete Pipe and Products Association, Seattle, Wash., Annual meeting, June or July, 1944.

National Chemical Exposition, American Chemical Society, Chicago Coliseum, Chicago, Ill., November 15-19, 1944.

National Industrial Sand Association, Annual Meeting, The Homestead, Hot Springs, Va., June 8-9, 1944.

Building After the War

THREE MONTHS after the war with Germany, sufficient supplies of most building materials and equipment will become available to permit large-scale resumption of residential and other civilian construction, states Russell G. Creviston, general post-war chairman of the Producers' Council, in a recent comment on post-war prospects for building.

"The production of most building materials has continued in large volume throughout the emergency to fill the requirements of the huge war construction program, with the result that relatively little reconversion is required to meet civilian construction needs after the war," Creviston said. "Consequently, materials manufacturers can resume the filling of non-war orders as soon as the war production program is cut back. It is anticipated that lumber will remain longest on the critical list, in view of the heavy requirements for crating of war supplies, but the end of the war with Germany should make it possible to release fairly large quantities of lumber for use in urgent civilian construction.

"The situation is somewhat different in the case of fabricated building products, inasmuch as many manufacturers have been producing goods other than their normal civilian lines during the emergency. With the exception of plumbing, heating, and electrical equipment, however, most companies report that they will be producing large quantities of products required for civilian building within three months after reconversion begins.

"A recent survey of the current production of building product manufacturers in the Council indicates that only 15 percent have discontinued their normal lines entirely, in favor of war goods. Over 26 percent have continued to make pre-war products exclusively in order to meet the demands of the war construction program and of essential maintenance, and 85 percent of the manufacturers have continued production of pre-war lines along with other products being made exclusively for war use."

Award Air Field Contract

ARIZONA SAND AND ROCK CO., Phoenix, Ariz., has been awarded a contract of \$207,687 by the War Department for construction of a taxiway and runway extension at an air field in Arizona.

From Gold to Ballast

THE UNITED GOLD MINES CO., Cripple Creek, Colo., is preparing to resume operations at its gravel plant near Midland. This company has a contract with the Chicago, Rock Island & Pacific Railroad for gravel

to be used for ballast. Gravel from this pit is disintegrated granite. This will be the fourth season that the pit has been operated.

Gravel "Locally-Needed" in Washington, D. C., Area

WAR MANPOWER COMMISSION recently announced that the sand and gravel industry in the Washington, D. C., area has been classed as "locally needed" because it was unable to maintain employment in the face of continuing heavy demands for its products. A large part of the capacity of the eight companies involving 400 workers was being used for vital military and naval construction work. Acting Area Director Arthur Schoenthal reported that employment had dropped by 25 percent in the industry during the past year, and that it had been necessary to ship sand and gravel from New York because local producers could not meet the orders because of lack of manpower.

Vote Against Union

ASH GROVE LIME & PORTLAND CEMENT Co. employees voted against representation by the United Cement, Lime & Gypsum Workers International Union in a N.L.R.B. election recently held at the Chanute, Kans., plant. According to the local report, the vote was 48 for union representation and 89 against. The plant is at present temporarily shut down.

Lehigh Plant Reopens

LEHIGH PORTLAND CEMENT Co., Iola, Kans., reopened April 17 after a three-months' shut-down with bins full. Depleted stocks have necessitated resumption of operations.

Quarry Adds Equipment

QUARTZITE STONE Co., Lincoln, Kans., has installed a new crushing unit of 100 tons per hour capacity operated with a 100-hp. electric motor. Additional power shovels have been added in the quarry to eliminate all hand loading. The company has been busy on a ballast contract with the Union Pacific Railroad to furnish material for the roadbed west from Silver Lake, Kans. This company also operates concrete pipe and brick plants. One of the difficulties experienced has been the purchase of new truck equipment.

Fifth War Loan Drive Needs Your Help

COOPERATING with the Treasury Department, ROCK PRODUCTS will devote its front cover this month to the Fifth War Loan drive. Publications with a combined circulation in excess of 140,000,000 copies will feature a \$100 War Bond on the front cover. The slogan will be, "Buy One of These Bonds Today!"

Starting June 12th and closing July 8th, all of us will be called upon to back up the men and women of the fighting services with our dollars, not our lives. The goal will be \$16,000,000,000 of which \$6,000,000,000 will be sought from individual investors. Your dollars through the purchase of war bonds will put you in the position of "Passing the Ammunition" to speed up the war effort so that the conflict will be shorter and our boys and girls can come back to peace-time pursuits. And finally buy war bonds because they are the best investment in the world.



Moving roofing slate to storage yard

Cement Production Down

BUREAU OF MINES reports that production of 6,139,000 bbl. of finished portland cement during March, 1944, was 64 percent below production in the corresponding month of 1943; a relatively unchanged rate of decline from the 45 percent decrease recorded in February. The monthly rate of decline has fluctuated between 41 and 50 percent since October, 1943.

Shipments from mills during March, 1944, showed less than the usual seasonal advance over February and totaled 6,225,000 bbl., which was 38 percent below the mill movement in March, 1943. Shipments during March were appreciably lower than the average March shipments during 1935-39, whereas during January and February, 1944, they were well above the average quantities shipped in these months of the base period. The more favorable position in January and February probably resulted from a larger than usual proportion of demand in those sections of the country where winter weather does not seriously curtail structural activity. This factor apparently was more than offset during March by the relatively lower demand in the remainder of the country in which the construction season starts in early spring. The March shipments slightly exceeded production and stocks of finished cement declined from February 29 to 24,987,000 bbl. on March 31. Stocks of cement made under the emergency alternate specifications are high at present and their disposal in an orderly manner represents the only prospective problem in adjusting the industry to post-war competitive markets for cement made under regular specifications.

The following statement gives the relation of production to capacity, and is compared with the estimated capacity at the close of March, 1944, and of March, 1943:

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	Mar. 1943	Mar. 1944	Feb. 1944	Jan. 1944	Dec. 1943
The month...	54.0	29.0	29.0	30.0	40.0
12 months...	73.0	47.0	49.0	51.0	54.0

Deraillment Stops Quarry

THE FRANCE STONE CO., plant at Bellevue, Ohio, was forced to shut down recently because a string of nine freight cars ran away down hill while they were being switched and were derailed, smashing into the tippie of the crushed stone plant and bringing it down on the cars. Production will be resumed as soon as repairs can be made.

Construct Lime Plant

C. B. CULLOR, of Unionville, Mo., has purchased a 28-acre tract west of Crane, Mo., from L. L. Russell for

the purpose of setting up a quarry and lime plant, according to local reports. Crushing equipment and a lime kiln are now being erected. Verne Cowen and L. E. Pettit of Unionville and John Simpson and Ruel Clevenger of Milan, Mo., will be in charge of various plant and quarry activities.

Job Relations Training

GRAYSTONE CONCRETE PRODUCTS CO., Seattle, Wash., has been giving their supervisory officials an opportunity to take War Manpower Commission course of study in the "training within industry program." Men taking the course are: Lars Andersen, superintendent; Howard Boyer, shipping clerk; Harry Stone, in charge of maintenance; Gordon Horst, block plant foreman; Mel Ward, night foreman; Paul Morgan, head machine operator; Robert Condon, engineer; and Richard Kramer, salesman.

Sand-Lime Brick Production and Shipments

Four active sand-lime block and brick plants reported for April and four for March, statistics for which were published in May, 1944.

AVERAGE PRICE FOR APRIL

	Plant Price	Delivered Price
Detroit, Mich. ....	.....	\$17.00
Saginaw, Mich.	\$15.00	.....
Grand Rapids, Mich. ....	.....	15.00
Seattle, Wash.	19.50	21.50

STATISTICS FOR MARCH AND APRIL

	March	April
Production	694,405	710,900
Shipments (rail) .....	.....	25,000
Shipments (truck)	634,405	654,900
Stocks on hand	882,000	865,000
Unfilled orders	870,000	1,175,000

*Four plants reporting: incomplete, one not reporting stocks on hand and two not reporting unfilled orders.

**Four plants reporting: incomplete, one not reporting stocks on hand and two not reporting unfilled orders.

Gypsum Association Accident Experience

GYPSUM ASSOCIATION, Chicago, Ill., has released data furnished by Harris Trust and Savings Bank, Chicago, concerning the First Annual Safety Contest of the association.

There are 17 companies that belong to the Gypsum Association. These companies operate 56 gypsum plants throughout the country. Of that number, 46 plants representing 11 of the member companies were active in the Safety Contest. The experience of 44 of the 46 plants is summarized below:

There were 1394 accidents reported. Four of these were fatalities, nine resulted in permanent partial disability, 369 caused time lost from work and 1012 required treatment of injuries by a doctor with no time lost from work more than the day of the accident.

There were 21,903 days of lost time

because of accidents in the 44 plants during 1943. This could be converted into terms of bombers produced or ships launched, but for our purposes it means a lot of production lost in the gypsum industry and is equivalent to the services of seven men for one year of 300 working days each.

Detailed information has been supplied by the Bank. This shows that there were 382 disabling injuries in the 46 plants. These produced a frequency rate of 26.95 for the industry. This means that there were 26.95 accidents for each million man hours worked in the plants. The National Safety Council, in the 1943 edition of "Accident Facts," reports a frequency rate of 14.85 for all industries in the nation. On the basis of this comparison, the industry must strive to prevent accidents and bring accident experience in line with other industries.

To give some idea of where the effort should be concentrated, data from the Bank shows the following breakdown of man hours and accidents by department:

Department	% of Man Hours Worked in Relation to Total	% of Accidents Reported in Relation to Total
Mine	12.62	18.6
Quarry	3.15	7.8
Plaster Plant ..	15.10	13.9
Board Plant ...	40.28	47.9
Block Plant ...	1.66	21.
Miscellaneous ..	27.19	9.7

Approve Gypsum Boards

IN WISCONSIN roof boards are being replaced by gypsum roof deck units on barns, garages, warehouses, and lumber sheds. The Industrial Commission of Wisconsin is approving this material for the duration of the war and six months thereafter, but subject to certain conditions:

1. The approval is given for the duration of the war and six months after this period. The Industrial Commission reserves the right to demand replacing or reinforcing of roofs on which the material has been used should deterioration occur which might make the roofs unsafe.

2. Approval is given for spans of 16 and 24 in. Greater spans than 24 in. cannot be used. The thickness of material for the 16 in. span cannot be less than 1½ inches.

3. Because of the danger of seepage in sags and depressions in flat roofs, the approval is given for pitched roofs only.

New Pipe Concern

A. & B. CONCRETE WORKS, Perris, Calif., is the new name of the concrete pipe concern formerly operated by Gus Almquist. Harvey Adair of El Monte and S. L. Babcock of Riverside, Calif., are the new owners. Mr. Almquist, according to local reports, will continue as manager of the plant. An order for irrigation pipe is keeping the plant busy.

Sand Recovery

Preparing for Correct Processing

By NATHAN C. ROCKWOOD

TWO PREVIOUS ARTICLES have dealt in general with the nature of sand deposits and the need for exploratory work, on the part of the producer. In common practice, at this point the producer plunges into designing or adapting washing and screening and sand classification (sizing) operations, and when he is through, he or the purchaser tries to find out what his end product really is and how he arrived at it—that is, as to size gradation, or screen analysis, impurities, soundness, etc.

If the producer is opening a new deposit, or contemplating radical changes in his present operation, he would do well to start from scratch and study his new material more thoroughly before designing the processing plant. Thus he may be able to simplify operations and save costs. For example, it costs power to raise tonnage from ground level to elevated processing equipment. Newer plants, if you examine into their design, will be found to be more and more in line with the idea of keeping the processing nearer ground level and elevating only products requiring further processing to bins or equipment designed for that purpose.

New Trend in Stockpiling

Also, there is a slight tendency to stockpile the raw material in a place accessible to the processing equipment rather than to stockpile finished products. The latter represent idle investment of considerably more value, or at least cost, than the stockpiled raw material; and these stockpiled finished products may represent obsolete or slow-moving sizes, which would then have to be reprocessed in any event. With a stockpile of raw material to work on, it may be processed to any current specifications; and by proper distribution of the material excavated from the pit in the raw material stockpile a much more uniform material may be fed to the plant processing equipment than is ordinarily the case—or raw material may be stored as selected material in more than one stockpile.

In the circumstance of old plants not designed for this method of processing, the rehandling of stockpiled raw material would of course add materially to the cost, although it might be justified by the probability of better end products. For, as has been said before, one prime reason for lack of satisfactory results in sand sizing, or classification, in practice, is lack of uniformity in the raw materials, lack of uniform feed-

ing to processing equipment, and hence lack of uniformity in the proportions of sand and water, and similar operating difficulties.

Plotting Size Gradations

We will assume that the raw sand has been separated from the gravel, for testing purposes, for this series of articles will deal primarily with

sand sizing and regrading to meet specifications. If the plant operator is testing his raw materials to determine the best methods of processing them, he probably had better *wet* screen the same sample, or the same sized sample, on a 100-mesh laboratory screen first. He can then study his finest material separately from the sand, in the same condition he will meet with it in the processing operations. If he dries it with the

(Continued on page 122)

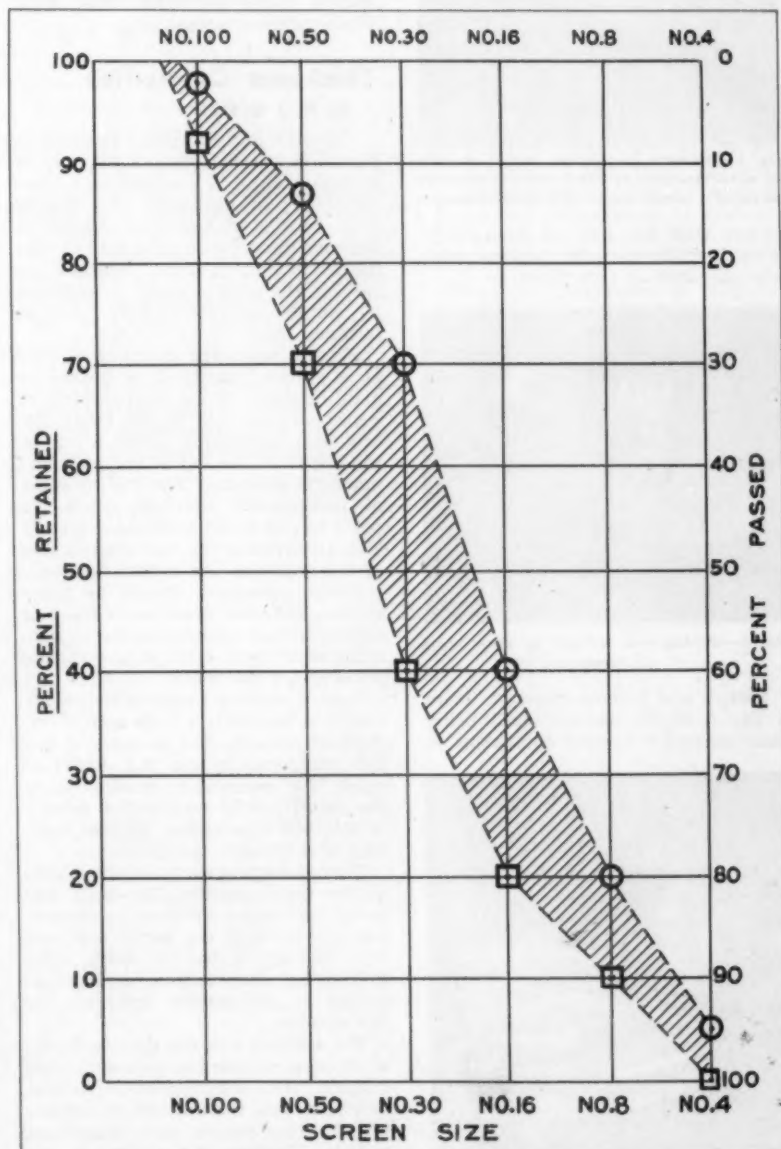


Fig. 1: Chart to assist in plotting specification size limits. Circular lots represent upper limits and square dots the lower limits of various sizes

HINTS *and* HELPS

Practical Ideas Developed by Operating Men

Weld Quarry Equipment

FRANCE STONE Co., Logansport, Ind., has found it possible to maintain heavy equipment at peak effi-



Fig. 1—Operator gauging the amount of built-up metal necessary to add to worn hammers by means of a sample gauge of original dimensions

ciency with the help of its welders. Two Lincoln electric welding units are operated at this plant.



Fig. 2—Welding new surfaces to worn edges of hammers

Figs. 1 and 2 show hammers from a 24- x 36-in. hammer mill being built up to an amount equivalent to



Fig. 3—Repairing worn dipper teeth by means of the electric arc process

that on the test gauge sample held in the operator's hand. Weld beads are laid crosswise, weaving from one side to the other. The electrode is of manganese steel type, 3/16-in. size with a machine set at about 175 amperes. It takes about three days for one man to build up a set of 39 hammers. Fig. 2 shows actual welding operation.

Fig. 3 shows the reclamation of worn dipper teeth of a 3 1/2-cu. yd. shovel. These are built up with manganese steel electrode with weld beads running crosswise.

Thickener Capacities

By H. J. GISLER*

CAPACITY of a thickener required to handle a pre-determined tonnage of a certain pulp, by overflowing a clear solution and obtaining the desired pulp density of thickener discharge, depends upon the settling rate of that particular pulp or slurry. The settling rate of any pulp is easily determined by simple laboratory tests such as outlined below:

Place a measured quantity of pulp at a known density in a beaker or glass cylinder. Fix a narrow strip of paper on one side of the container. Mix pulp thoroughly. Draw a line on the paper at the top of the pulp and mark "0" minutes. For five minutes, at one-minute intervals, mark the point to which the solids have settled. This determines the free settling rate of the solids at the initial density.

Usually readings should be taken at three different densities of the pulp corresponding approximately to densities which will exist in the various zones in the thickener.

Decant sufficient clear water or solution to establish a pulp with intermediate density. For instance, if initial pulp density was 4:1, water to solids, the removal of one-fourth of the water would establish a density of 3:1. Mix thoroughly. Repeat readings of settlement as above.

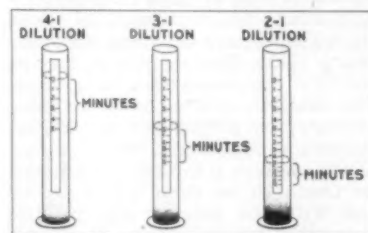
Then decant again to obtain a pulp at the third density. The pulp just tested was at 3:1 dilution, so decanting one-third of the water will give 2:1 dilution, water to solids. Mix thoroughly. Repeat settling measurements at one-minute intervals for five minutes.

The settling rate per minute should be uniform during the testing at each dilution, until compression is reached, at which time the amount of settling will decrease during each succeeding minute. Measure the settling marks in inches, thus determining the set-

ling rate in inches per minute for each pulp density, and convert this to feet per hour.

Final density is then determined. Thoroughly mix the pulp remaining after the test at 2:1 dilution and allow to settle for 19 hours. Mark the position of settled pulp and let stand for a few hours to see if final density was reached. If pulp continues to settle, mark its position at hourly intervals until settling stops. Decant off all clear water or solution. Then determine moisture content of pulp by weighing and drying.

Thickener area required is then calculated by applying above deter-



1—Testing three different pulp densities in glass tubes

mined data in the following formula:

$$A = \frac{1.333(F-D)}{R}$$

A = Thickener area in square feet per ton of dry solids thickened in 24 hours.

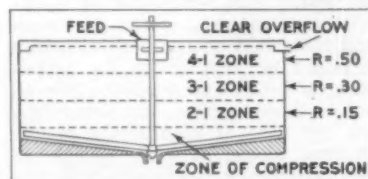
F = Initial density (Parts Water to Solids by weight).

D = Final density to which pulp will settle or density at which you want to discharge pulp from thickener.*

R = Settling rate in feet per hour.

* Usually it is desired to discharge pulp from the thickener at its final density as shown in the above test. However, if you want to discharge pulp more diluted than the actual final density, the density desired should be used in above formula rather than the final density to which the pulp will settle.

Calculations of indicated thickener area from each of the three settling rates obtainable in tests will indicate any change in settling rate in the different zones of the thickener, and the largest area obtained from the three calculations should be used.



2—Showing three zones in thickener from which pulps for test were taken

*Denver Equipment Co.

HINTS AND HELPS

Assume the following data was obtained from the above tests:

At 4:1 dilution $R = 0.50$ feet per hr.
At 3:1 dilution $R = 0.30$ feet per hr.
At 2:1 dilution $R = 0.15$ feet per hr.
Final density $D = 1:1$

Applying this data to above formula, you obtain:

$$A = \frac{1.33(4-1)}{.50} = 7.98$$

$$A = \frac{1.33(3-1)}{.30} = 8.86$$

$$A = \frac{1.33(2-1)}{.15} = 8.87$$

Normally a 25 percent factor of safety is allowed in determining the thickener area size. Thus, in the above case, 8.87 (largest of three figures) plus 25 percent factor of safety, equals 11.09 square feet area required per ton of dry solids fed to the thickener per 24 hours.

If the pulp reached its final density during the 19th hour test, a standard depth thickener is considered adequate. However, if additional time was required to reach final density, the thickener volume would have to be large enough to retain the pulp for this extra time.

Standard thickener depths are as follows:

Thickener Diameter	Standard Thickener Depth
5 to 7 ft.	4 ft.
8 to 11 ft.	6 ft.
12 to 25 ft.	8 ft.
26 to 40 ft.	10 ft.

Another factor to be considered is the storage capacity desired in a thickener. For example, it may be necessary to shut a filter down for repairs and at the same time keep the balance of the mill in operation. In this case the thickener will act as a storage reservoir. Where storage capacity in a thickener is of importance such as in many of the non-metallic flotation plants, a larger factor of safety should be applied in calculating the area. Greater depth should not be used unless the lift of the thickener mechanism can also be increased.

Calculator Computes I²R Quickly

By V. W. PALEN*

IN THE ILLUSTRATIONS may be seen a device which determines I²R loss in wire circuits with a flick of the finger. Cut along the circles to make two discs and two rings. Using rubber cement, mount the discs on separate pieces of cardboard—on reverse sides of a third piece of cardboard mount the two rings. Now punch the center holes and insert a small brass bolt to hold the discs in place. Washers will help to prevent wear and tear on the paper. Tighten the bolt to provide the proper pressure on the discs—they should hold their settings, yet turn easily. A drop of solder applied to the nut will make the assembly permanent. The calculator solves the single phase equation:

$$\left[\frac{Kva}{Kv} \right]^2 \times 2R = W$$

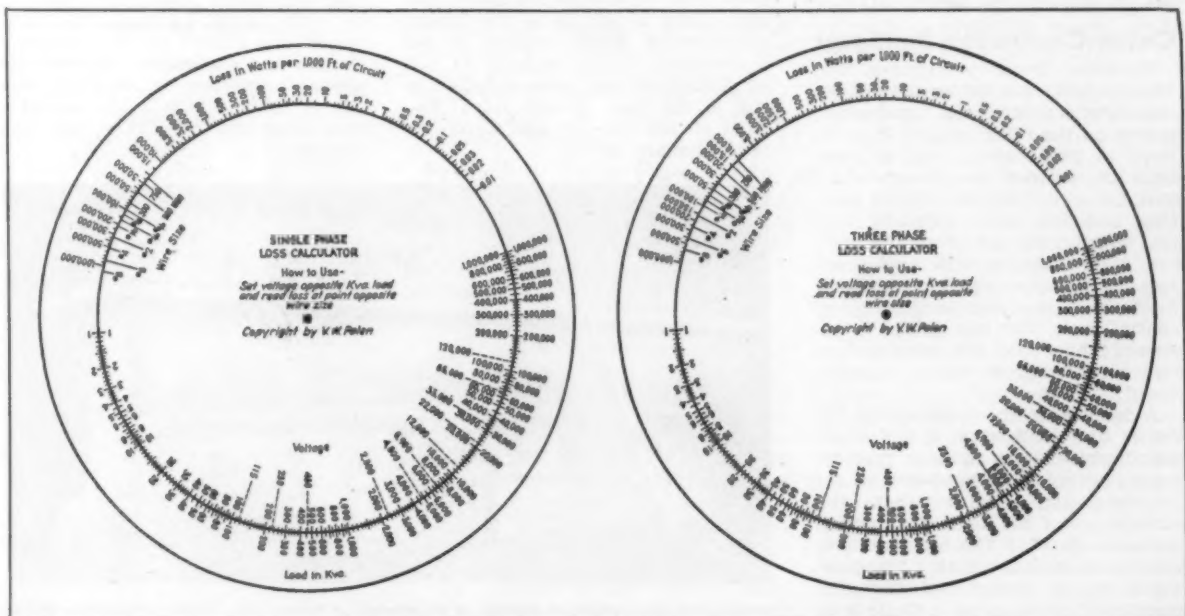
EASY DOLLARS

● Now that the pressure has let up on production in the rock products industries, operating men have an excellent opportunity to dig up some of those ideas that have been kicking around for reducing maintenance, increasing efficiency of machinery, and equipment, and improving plant safety. The HINTS AND HELPS section of ROCK PRODUCTS is Your page to reduce these ideas to print. Just jot down the facts, and send us a pencil or ink sketch or possibly a snapshot and the editorial department will do the rest.

A minimum of \$5.00 is paid for every Hint and Help item sent in for publication; it may easily bring you \$10 or more, depending upon the item's length and illustrations. Why not get some of these easy dollars by sending in your ideas and also benefit the industry by passing on the information to others?

Where R is resistance of 1000 ft. of single conductor and W is watts per 1000 ft. of circuit. The three-phase equation handled by the device is equivalent to the single-phase relationship divided by two. Copper conductor is, of course, the basis of design—stranded on sizes No. 2 and larger.

*With Westinghouse Electric & Manufacturing Co.



Circular discs from which rapid calculator can be made to compute I²R

NEW Machinery

D-C Vertical Motors

GENERAL ELECTRIC Co., Schenectady, N. Y., is in production on a new line of direct-current vertical motors ranging from 40 to 200 hp. at 1750



Direct-current, vertical motor

r.p.m., and in equivalent ratings at other speeds. These motors, furnished for both constant and adjustable speeds, are designed for low-thrust, solid-shaft applications on pumps.

The motors are said to be drip-proof, providing protection from dripping liquids and falling objects. Convenient fittings on both the upper and lower bearings simplify lubrication, and provision for the escape of excessive grease reduces the possibility of over-lubrication. A special bearing housing prevents grease from entering the motor and damaging the commutator and the windings.

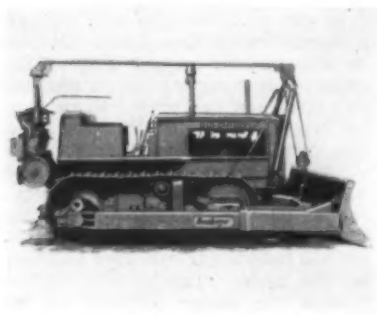
Cable-Controlled Bulldozer

BUCKEYE TRACTION DITCHER Co., Findlay, Ohio, has announced a cable-controlled bulldozer and trailbuilder, known as the "Centro-Lif." It is offered in two models; one weighing 5855 lbs., without the power control unit, for Allis-Chalmers HD-14 tractors, and the other, weighing 5140 lbs., without the power control unit, for Allis-Chalmers HD-10-W tractors. Both models are controlled by Buckeye single or double-drum power control units. The new design is engine-mounted and the cable is carried overhead from winch to moldboard.

A feature of the bulldozer is the center lift construction of the moldboard which, it is claimed, provides many advantages: light-weight for its size, simple construction, and straight lift of the blade. The horn is designed so that the moldboard is close to the tractor radiator. The push arms are so constructed that the moldboard pivots about a single king pin and can be angled to the right

or left simply by removing two land-side pins, swinging the moldboard to the desired side, and replacing the landside pins. The moldboard also can be easily tilted by means of a double trunnion mounting of the push arms. By attaching one push arm to the top trunnion on one side while the other arm is mounted on the lower trunnion on the opposite side, a vertical adjustment of 12 in. at the end of moldboard is provided.

Maximum height of lift of leading corner of blade is 53 in., while digging depth of blade below grade is unlimited. The moldboard is 12 ft. 9%

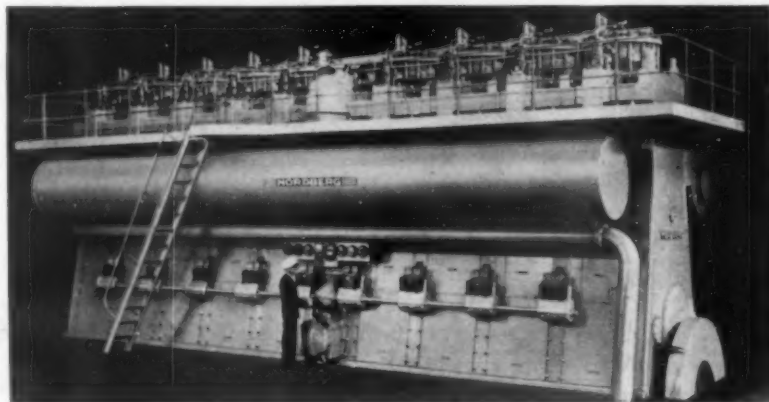


Bulldozer moldboard of center-lift construction

in. long and 37-9/16 in. high, and is fitted with reversible cutting edge and replaceable corner bits.

Largest Diesel Engine

NORDBERG MANUFACTURING Co., Milwaukee, Wis., has just completed shop tests on a 6000-hp. Diesel engine which is said to be the largest single-acting Diesel engine so far constructed in this country. It will be dismantled and later installed in one of the new Victory ships. Engines of this type are also applicable for stationary service.



Single-acting Diesel engine of 6000-hp. to be installed on Victory ship. Similar engines are applicable for stationary service

The engine, which has a speed of 160 r.p.m., is of the two-cycle, single-acting type. It has nine cylinders which have a bore and stroke of 29- x 40-in. A mechanical fuel injection system is used.

Sealing Putty

THE B. F. GOODRICH Co., Akron, Ohio, advises that Plastikon putty, used for glazing and sealing purposes, is now made of synthetic rubber. At the present time it is employed chiefly for sealing metal joints in combat equipment. For this purpose the new putty made of synthetic rubber is said to be better than the product made from natural rubber.

Wire Rope Fitting

GARLINGHOUSE BROTHERS, Los Angeles, Calif., are manufacturing what is known as the Gar-Bro Shimble, a wire rope fitting that is both a

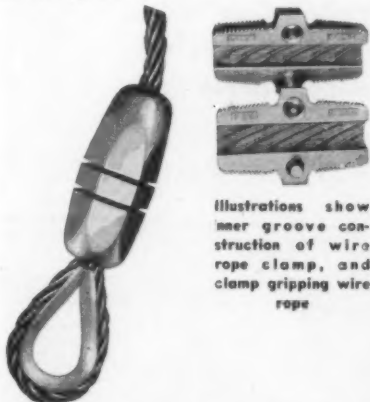


Wire rope fitting which serves both as a shackle and thimble

shackle and a thimble. It is said no special connection is required; just clip or splice a loop in the end of a rope and slip the loop over the shimble.

Grooved Wire Rope Clamp

NATIONAL PRODUCTION CO., Safe-Line Clamp Division, Detroit, Mich., recently added four new sizes to its line of wire rope clamp fittings. The thirteen sizes now range from 1/16 in. to 3/4 in.

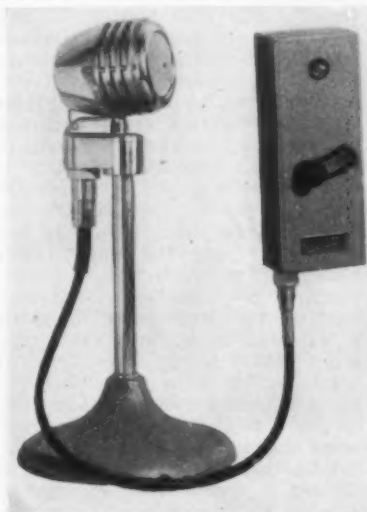


Illustrations show inner groove construction of wire rope clamp, and clamp gripping wire rope

Inside grooves, shown in the illustration, which fit the rope are a patented feature of the Safe-Line clamp. The clamp, forged of high tensile strength steel, is made in two halves. The inside of each half is made to fit the rope; large grooves pocket the large spiral strands, and small grooves pocket each small wire that makes up the strands. Alloy steel nuts grip the two halves tightly on the rope. Sharp ends of wires are covered, and there are no projecting parts. The patented design is said to eliminate splicing.

Microphone Control Box

EXECUTONE, INC., New York, N. Y., has announced its Model P566 relay and busy signal control box for connection to microphones in its rack



Microphone control box with busy signal

and panel amplifier sound systems. Installed with microphones in such locations as guard houses, reception desks, telephone switchboard and at plant broadcasting centers, it coordinates the operations of multiple microphones and provides an instantaneous method of cutting in on central plant sound systems. A busy signal light eliminates interruption from other microphones in the same system. The talk-switch prevents accidental broadcasting of unwanted sounds, provides automatic plate voltage relay control, reducing wear on amplifiers, and automatically cuts off music broadcasting when paging is desired.

Stacking Lift Truck

WILLAMETTE HYSTER CO., Portland, Ore., has brought out its Hyster "7" lift truck which can be effectively used for short distance transportation as well as for stacking and tier-



Hauling unit designed with a lift of 108-in.

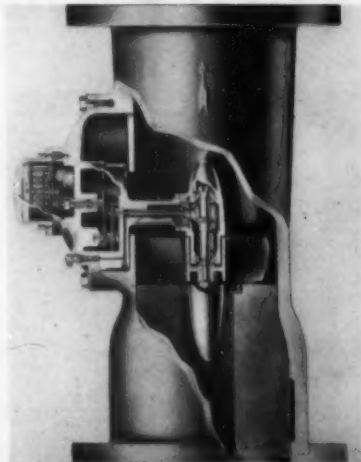
ing. It has a working speed of up to 12 miles an hour either forward or backward, ability to turn in its own length of 117 in., has an overall width of 60 in., and a capacity for handling 7500 lbs.

On standard models the height of lift is 108 in. from the ground to the under side of the load but this distance can be altered on special orders and adapted to special materials handling problems.

Propeller Type Flow Meter

BUILDERS-PROVIDENCE, INC., division of Builders Iron Foundry, Providence, R. I., has announced a propeller type flow meter for main line metering which has a number of improvements including streamline venturi construction.

Called a Propeloflo meter, this unit has an 8-blade bakelite propeller moulded in one piece. Rotation is transmitted through spur and bevel gears. Shafts rotating in ball bearings drive indicating and recording devices or proportioning chemical feeders. A venturi throat evenly distributes the force of the flow against the full area of the propeller, which is said to result in improved accuracy throughout an exceptionally wide range of flow. Spiral flow is eliminated by straightening vanes



Venturi type flow meter for measuring flow of liquids in pipe lines 6 in. or larger

just upstream of the propeller.

To reduce flow disturbance and divert fine grit, sand or scale away from the mechanism, the propeller hub, bracket and nose are of streamline design. Model PRF is a precision-made instrument providing accuracy and low pressure loss in measurement of liquid flow in lines 6 in. and larger. It is indicated that this flow meter may have a number of applications in the rock products industries.

Steel-Cable Conveyor Belts

GOODYEAR TIRE AND RUBBER CO., Akron, Ohio, has been conducting research studies of a new steel-cable "compass" conveyor belt which, according to W. C. Winings, manager of the Mechanical Goods Division of the company, will permit conveyor operations extending as far as 6 1/2 miles in a single belt.

Development of the steel-cable belt for moving bulk products came as a result of projects that required cotton-belt designs where the cords had to be as large as 1/2 in.

In this type of belt, the cables are laid in parallel, side-by-side for the full length of the belt in a single plane. Cables are brass-plated prior to being covered with rubber, thus obtaining adhesions, rubber to steel, much higher than were possible in steel to cotton.

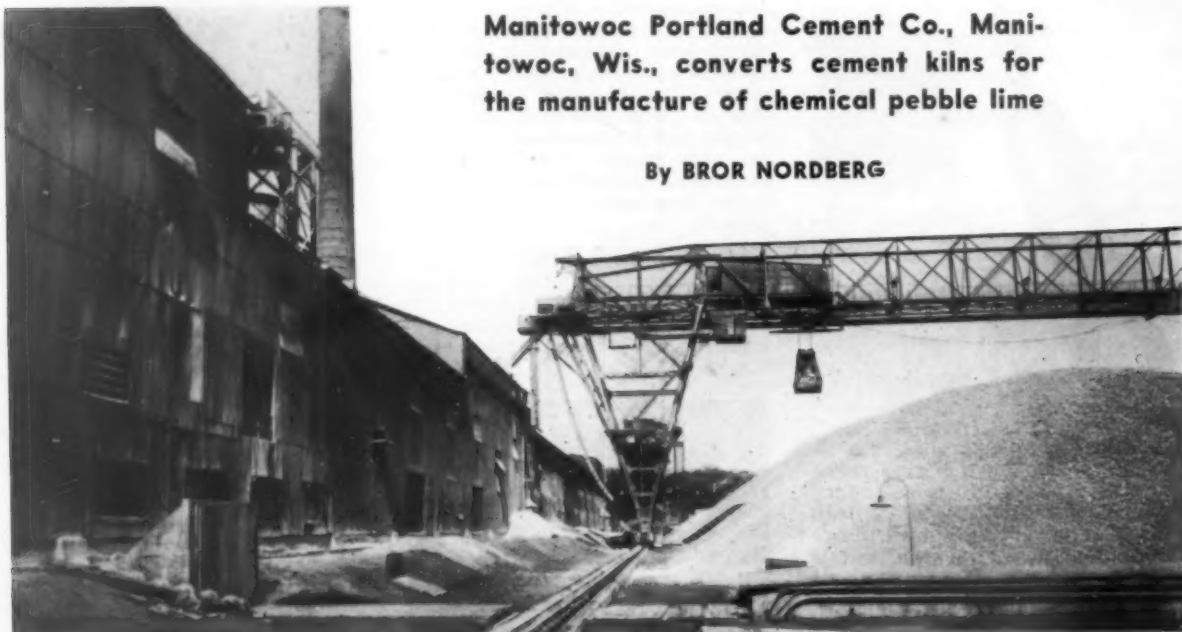
The flex life of steel cables exceeds that of cotton-cord, rope or fabric. One reason for this is that the 3/64-in. steel cable is so small it enjoys a ratio of 1000 to 1 when flexed over a conventional 48-in. head pulley, whereas good wire rope practice would ask for a ratio of sheave to cable diameter of 80 or 100 to 1. With steel cables, not exceeding 5/32-in. and an overall belt thickness no greater than the conventional 6-ply structure, a strength equivalent to 60 plies of heavy duck

Calcination

Make Lime and Cement Simultaneously

Manitowoc Portland Cement Co., Manitowoc, Wis., converts cement kilns for the manufacture of chemical pebble lime

By BROR NORDBERG



Traveling bridge crane feeding high calcium stone from stockpiles in foreground into storage bin for production of lime. Cement raw materials are fed by same equipment to raw grinding department at extreme end of plant in the background

SEVERAL portland cement concerns have recently adapted their facilities to the manufacture of products other than portland cement. Chemical lime is one of the principal products, and several mills have been changed over to its manufacture through their rotary kilns. In most cases, the transition from portland cement to the manufacture of lime or other critically-needed products is temporary. Those mills are putting their temporarily idle facilities to good use, and will be converted back to cement manufacturing as soon as markets become readjusted. Therefore, the mill revisions incident to the manufacture of a new product are held to a minimum, and it is of great interest to know how such changes are made.

Manitowoc Portland Cement Co., Manitowoc, Wis., a subsidiary company of the Medusa Portland Cement Co., Cleveland, Ohio, has been manufacturing chemical pebble lime since the fall of 1943, for the Marblehead Lime Co. This plant is of particular interest since it has manufactured lime exclusively for approximately four months, and is now simultaneously manufacturing chemical lime for war industries and also standard portland cement.

The mill at Manitowoc is a wet process plant, with three 10- x 160-

ft. rotary cement kilns having a rated daily capacity of 3300 bbl. of standard portland cement, ground to 1650 sq. cm./gr. In order to fully describe how the mill was converted to burn chemical lime, and still manufacture portland cement, we will first briefly mention the general layout of the plant. The types of equipment, their location and the methods of handling materials are all important factors that influenced the decision to burn lime.

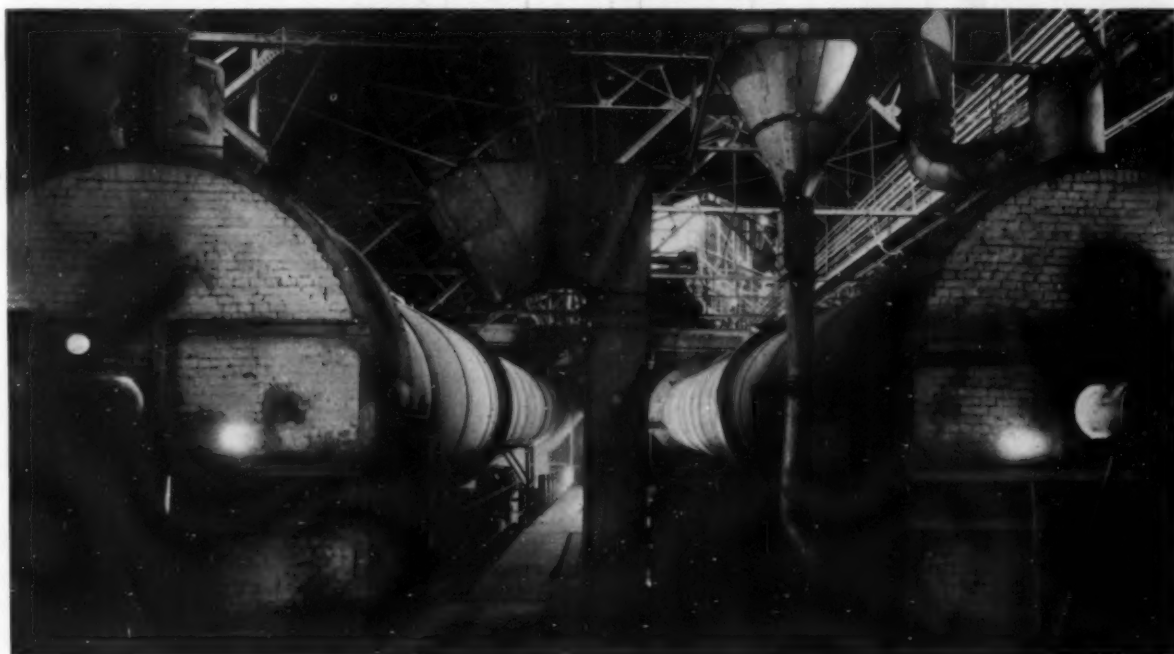
Layout of Cement Mill

The mill might be called a "straight-flow" plant. It is located alongside the wharf at Manitowoc, with the raw mill building at one end and the finish mill building at the opposite end, and with the kilns in between. The entire layout parallels the wharf and raw materials are fed to the raw grinding department by a bridge crane with a 3½-cu. yd. bucket. The crane travels parallel to the plant, over the stockpiles which are between the mill and the dock. Limestone for cement manufacture is shipped to the plant in lake-going ships from Port Inland and Rockport, Mich. It so happens that this stone is a high-grade limestone testing up to 96 percent CaCO_3 , which is very suitable for burning chemical lime. The only new requirement, for

lime, is that the suppliers screen out the fines and deliver a stone from ¼-in. up to 1¼- or 1½-in. in size, whereas the fines are desired for cement manufacture.

Other raw materials for the manufacture of portland cement are shale, which is proportioned with the limestone volumetrically into the raw mill, and clay which is added in the form of slurry to correct the raw mix. Raw grinding is done in two stages, first through two kominuters (with added water) in closed circuit with two banks of three Tyler Hummer vibrating screens and then through two 7- x 22-ft. tube mills in open circuit. Grinding capacity is 150 bbl. per hour of 97 plus percent minus 100-mesh kiln feed material. There are five slurry tanks and two clay tanks, and the slurry, after blending and correction, is then pumped into kiln feed tanks over each of the three kilns. This plant is equipped with three drum-type slurry filters which have been in operation for many years and the slurry cake is fed into the kiln feed spouts by belt conveyors. It is of interest that in recent years the practice has been to heat the slurry to 120 deg. F. by live steam in order to increase its filterability. The mill is a waste heat plant, with three 741-hp. B. & W. waste heat boilers, equipped

CALCINATION



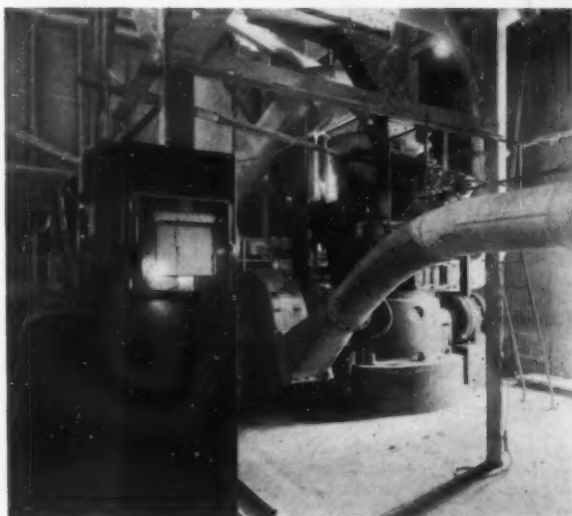
Kiln on left is burning lime; one on right is producing cement clinker. Recuperator has been removed from lime kiln

with economizers. Each boiler is operated from the gases from its separate kiln. There are three separate dust chambers and the exhaust is through a common flue to a single stack. When under full production on portland cement the mill will develop sufficient electrical power for its requirements, but it has a contract to purchase electrical energy from the local power company when supplemental power is needed, usually on two or one cement kiln operation. Under the terms of the contract, the power company will purchase excess

power from the cement company.

Within recent years important improvements had been made to the kilns. Each had been equipped with a direct-firing bowl mill and a heat recuperator. The primary air-coal mix injected into each kiln is approximately 175 deg. F. and the coal grind is 93 percent through 200-mesh. Primary air for drying the coal as it is ground is taken from the kiln hood and tempered in each case, and the secondary air for combustion, 80 percent of the total, enters the kilns through the recuperators.

Each kiln discharges clinker through an 8- x 60-ft. rotary cooler, at 180 deg. F. and, up to the time lime manufacture started, a continuous Peck carrier placed the clinker into preliminary grinding mill feed bins or placed it into storage outside the finish grinding mill building. Another improvement of a few years ago was the installation of Multiclone dust collectors above the discharge end of each kiln and the point of entry of the clinker into the rotary cooler, to draw dust from within the cooler, counter-current to the flow of



Left: One of the unit coal mills firing lime kiln. Note kiln temperature recording Micromax to the left. Right: Kiln making high calcium lime is equipped with optical pyrometer as well as Micromax on instrument board

CALCINATION



Tanks for finished pebble lime have a capacity of 600 tons. They are filled and drawn from by means of an endless carrier which loads cars and also brings lime from coolers. Cement clinker was formerly stored in this area

clinker. Each dust collector has 30 small cyclones and clinker dust is discharged into the clinker stream from the coolers.

Finish grinding of clinker into cement is accomplished through two stage grinding. Two Hercules mills receive their feed of clinker and gypsum from bins. The clinker bins hold 300 bbl. each. With a 14-mesh peripheral discharge screen, the mills discharge a product that is 50 percent through 200-mesh. Finished grinding is accomplished through two 7- x 22-ft. tube mills in closed circuit with a 16-ft. mechanical air separator. Finished product is pumped into silos of 300,000 bbl. capacity.

When the demand for portland cement dropped off and there developed a market for high calcium lime, the problem was to adapt this plant to its manufacture without radical alterations. Production of lime started in September, 1943, and continued until January, 1944, on either one or two kilns, dependent upon the demand. No cement was manufactured during this period. In January stocks of cement had fallen off to the point that it became necessary to resume its manufacture. As this is written, No. 2 kiln is producing portland cement clinker, No. 3 kiln is producing lime and No. 1 kiln is set up to produce lime, should the demand require the output of two kilns.

Plant Revisions

In producing the two products simultaneously, the raw mill grinds the cement slurry and No. 2 kiln is fed and operated as described earlier. The same bridge crane that feeds limestone and shale into the raw mill is moved to a point alongside the feed ends of the kilns to place the limestone for lime manufacture into a bin through the roof of the building.

The storage bin in this case is a 240-ton capacity corrected slurry tank under No. 1 kiln, which is the standby kiln for lime manufacture.

In order to serve as a storage bin for stone, the slurry tank has been fitted with eight manually-operated drawoff bin gates through which stone is released into a 5- x 10-in. drag conveyor which transfers into a bucket elevator to fill a distributing hopper on the level just over the kiln feed ends. This distributing hopper is an ordinary rectangular bin of about 10 tons capacity which has two flop gates to regulate the flow of stone into the kilns. Continuous 18-in. belt conveyors carry the stone from either or both of the gates and discharge stone through the kiln feed spouts into the kilns—a long belt to the far kiln (No. 3) and a short one for No. 1 kiln. The flop gates, set to permit a uniform depth of stone to

be carried over the belts, are fitted with electrical contact flashers which signal the bin gate operator below the storage tank when the depth of stone carried over the belts is insufficient to maintain contact with the flop gate. The operator then opens the gates to release sufficient stone to maintain the level in the distributing hopper. As a further check on the quantity of stone being fed, the amount of stone carried over a 4-ft. length of belt is scooped off at regular intervals and weighed.

The kilns for burning lime turn at the same rate and have the same lining as the one burning cement clinker. The filter cloth on the slurry filters was removed for re-installation when the kilns are reconverted to burning clinker. All the kilns are direct-fired by the unit coal mills, but the heat recuperators were removed from the kilns burning lime. The reason given for their removal is that a long, lazy flame is desired (for its effect on the quality of the lime) as contrasted to the short, intense flame used to burn cement clinker.

Whereas, the secondary air to support combustion in the cement kiln is preheated through the heat recuperator, the secondary air for calcining the lime enters the kilns around the kiln hoods. Lime is burned at 2300 deg. F. to 2400 deg. F. and portland cement clinker at 2500 deg. F. Kiln No. 3, on lime, is equipped with a Leeds-Northrup optical pyrometer and continuous recording Micromax, as a check on burning temperatures.

Removal of the heat recuperators was the major change required to manufacture lime, but other minor changes to the coolers and handling equipment for the finished product were necessary. In order to minimize



Keeping a check on lime quality by screening and weighing as a control of over- and under-burning. Lime is slaked, screened and dried for residue determination

CALCINATION

breakage of the pebble lime, simple angle iron lifters have been installed to replace the lifters ordinarily used in the coolers. As the lime discharges from the coolers, its temperature has been reduced to 150 deg. F. Lime cools faster than portland cement clinker.

When production of lime was first started, the plant was not calcining cement clinker and the lime discharged directly into the Peck carrier for transfer into the finish mill feed bins which hold 300 bbl. each.

When No. 2 kiln went into production on cement clinker in January, the grinding mill feed bins could no longer serve for storage of pebble lime. Three steel storage bins of 600 tons total capacity were erected in the old clinker storage area outside the plant, arranged in a row so that they can be filled with lime by the Peck carrier. Box cars are loaded direct from the Peck carrier stream or through use of a box car loader, and there are drawoff gates under the three bins for removal of stored lime for loading cars. The Peck carrier had to be covered, of course, to protect the pebble quicklime from rain.

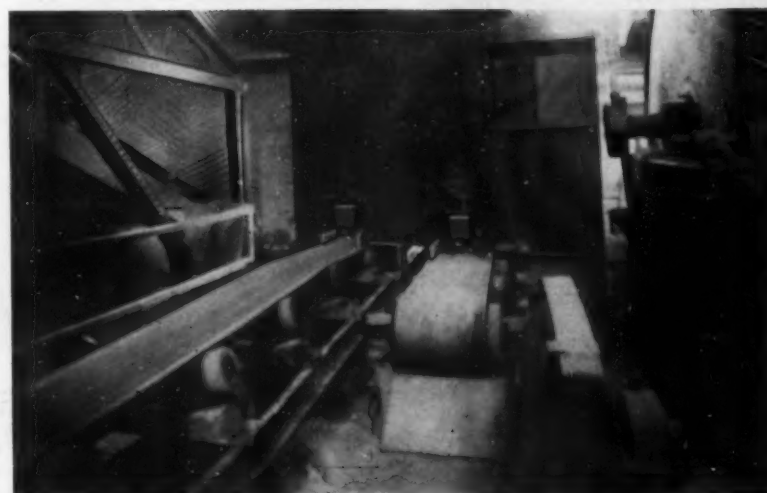
A substitute method for handling clinker from cooler No. 2 had to be devised. The 60-ft. cooler had to be shortened by 5 ft. to allow for installation of a 5- x 10-in. drag conveyor, and a bucket elevator had to be installed to fill the mill feed bins. The only weakness of this handling system is that the only reserve storage of clinker now available is that stored in the mill feed bins and it is necessary to grind one binful while the other is being filled.

Lime dust collected in the boiler hoppers is fed into the cement kiln through a dust feeder. Clinker dust from the boiler is mixed with the fresh feed in the kominuters. Clinker dust collected in the Multiclones from the cement kiln cooler is spouted into the drag conveyor handling clinker to the grinding mill bins. Lime dust from the lime kiln coolers is returned into the Peck carrier.

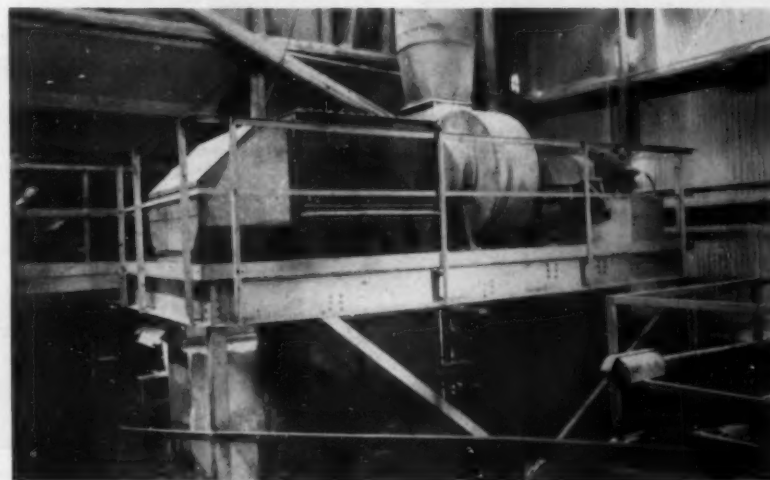
Production of lime through one kiln is 165 tons per day and the fuel ratio is 1:3, when burning a 10- to 12-percent ash, 12,000 B.t.u. Kentucky coal that is also regularly burned in making cement. The cement kiln is producing 1150 bbl. of clinker per day with a fuel consumption of 112 lb. of coal per bbl.

Production of lime is varied as demands made upon the plant decrease, by reducing the feed of stone and coal proportionately while holding the combustion air constant. The draft on the cement kiln is maintained at .2 in. of water and for lime at .25 in. to .3 in. No figures on volumes of heated gases and velocity of flow through the kilns are available.

(Continued on page 107)



Above: Looking toward kiln feed end of conveyor. Conveyor on right is for slurry cake when cement is produced. Now stone is fed from belt on left to make lime. Below: Belt conveyors feeding limestone into rotary kilns. Short belt is for nearest kiln, below; long belt is for the farthest kiln. These two kilns are set up to make lime; third kiln in between is making cement.



One of three dust collectors. Lime dust from cooler is returned by conveying system to storage

Effect of Aggregate Segregation on Concrete Strength

By ARTHUR C. AVRIL*

LITERATURE on concrete seems to contain very little information on how much segregation of aggregate affects the quality of concrete. For some unknown reason, or because it is taken for granted, the subject has been cast aside just as though it were something annoying which was ever present but about which nothing could be done.

It seems as though nature has been taking exception to this neglect by causing an endless amount of trouble for the engineer, architect, inspector, contractor and producer, making it virtually impossible for anyone to design and control concrete mixes accurately because aggregate segregation is ever present to thwart all effort in that direction. Having been victimized many times by this natural phenomenon I decided to conduct a few experiments this past winter to see just what variations in concrete quality could be expected from its influence.

First of all, some time was spent going through one of the most modern gravel plants to see just how well the sand and gravel were being graded. From all appearances both of them were being sized very carefully and were leaving the screens and sand classifiers in as uniform a condition as possible.

Having been satisfied that the plant was producing uniformly well graded material, the stock piles were inspected and three samples of sand and three of one-inch gravel were taken from their respective piles. These were taken from the base, the middle of the slope, and the crest, representing the coarsest, the average and the most finely graded sand and gravel found in the piles. The sand specimens were numbered 1S, 2S and 3S, representing the base, middle, and crest of the slope, respectively. Samples of gravel were numbered 1G, 2G and 3G in the same order as the sand samples.

Screen Analysis of Stockpile

It was easy to see and feel how different these specimens were without further investigation but mere observation cannot tell the whole story, so accurate screen analyses were made of each sample. The prod-

Tests of concrete made from samples of sand and gravel taken at different points in stockpiles indicate extent to which segregation affects the concrete quality

ucts of each sieve size were placed in glass containers and photographed. After computing the fineness moduli of the six samples two mixes were designed using sand 2S and gravel 2G because these were almost a true representation of the aggregate being

produced in the plant. One mix was designed for a 28-day strength of 2500 lb. per sq. in. in compression and a 3-in. slump, the other was designed for 4000-lb. strength and a 6-in. slump. The 2500-lb. mix was numbered 2-73 and the 4000-lb. mix

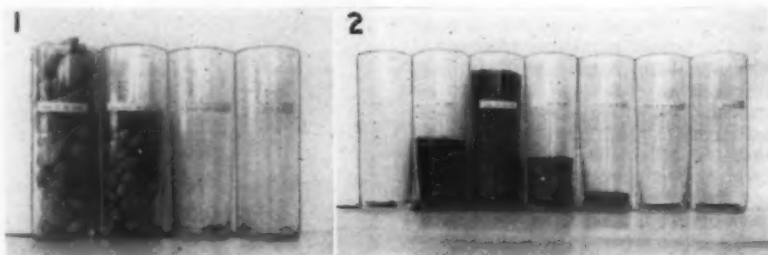


Fig. 1: Sample 1G taken at the base of the gravel pile has a fineness modulus of 7.6. Material in bottles, from left to right, 1/4-in., 3/8-in., 1/2-in., and pan deposit. Fig. 2: Sample 1S taken at the base of sand pile has a fineness modulus of 3.96. Sizes in bottles from left to right, 1/4-in., No. 8, No. 14, No. 28, No. 48, No. 100, and pan deposit.

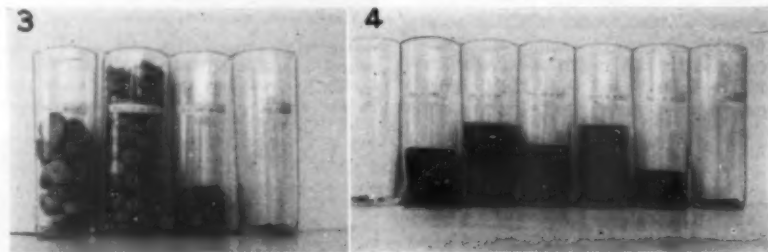


Fig. 3: Sample 2G taken from middle of gravel pile had a fineness modulus of 7.2. Fig. 4: Sample 2S taken from middle of sand pile had a fineness modulus of 3.10.

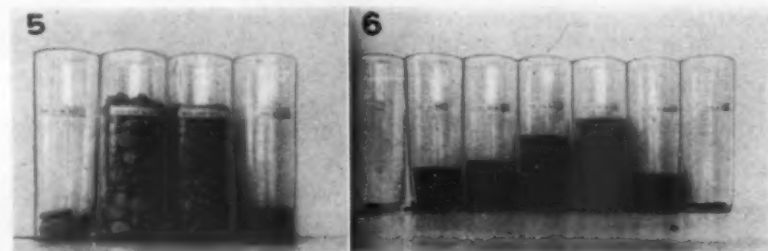
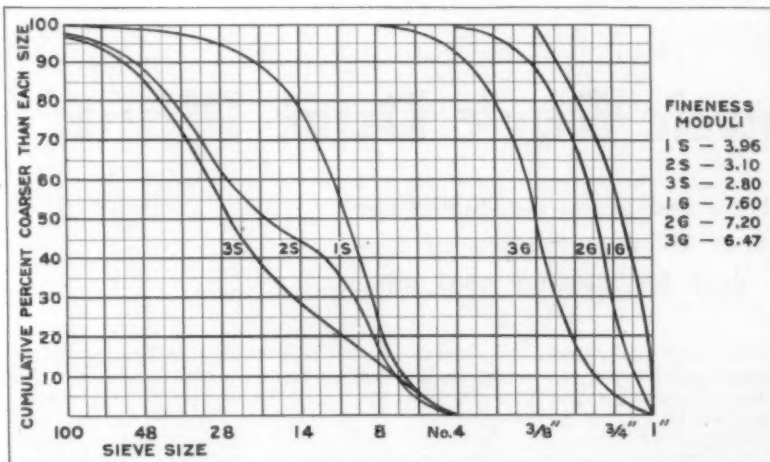


Fig. 5: Sample 3G taken from top of gravel pile had a fineness modulus of 6.47. Fig. 6: Sample 3S from top of sand pile had a fineness modulus of 2.89.

*President, Sackrete, Inc., Cincinnati, Ohio.



Graph showing fineness moduli of various samples of sand and gravel taken at different levels in the aggregate producer's stockpiles

was numbered 2-57. The number 2 represented the type of aggregate used in the designed mix and numbers 73 and 57 stand for the water cement ratios. The method of design for the 2500-lb. mix was that recommended by the A.C.I. committee No. 613 which recommendation was published in the November issue of the *A.C.I. Journal*. The 4000-lb. mix was designed in accordance with the method I have been using for some years.

Strength Tests

As evidenced by the photographs of the slump tests, the two designed mixes using sand 2S and gravel 2G made good workable concretes, improvement of which would have been very difficult. Mix 2-73 designed for a strength of 2500-lb. and a 3-in. slump tested 3430-lb. compressive strength per square inch in 28 days and slumped 3 in. Mix 2-57 designed for a strength of 4000-lb. and a slump of 6 in. actually tested 4775 p.s.i. in 28 days and slumped 7½ in.

Using identically the same weights of cement, sand, gravel and water in the next mixes 1-73 and 1-57 but

using sand 1S and gravel 1G instead of 2S and 2G, it was found that instead of the 2500-lb. mix slumping 3 in. it slumped only 1½ in., was very harsh and tested only 2900 p.s.i. The 4000-lb. mix, using sand 1S and gravel 1G, slumped only 6¼ in. and tested only 4455 p.s.i.

The third pair of mixes were also composed of identically the same weights of cement, sand, gravel, and water as the designed mix, but sand 3S and gravel 3G from the crest of the piles replaced 2S and 2G. Test results for these, numbers 3-73 and 3-57 were as follows: the 2500-lb. mix, number 3-73, slumped 1¼ in. and tested 3325 p.s.i., and the 4000-lb. mix, number 3-57, slumped 6½ in. and its 28 day strength was 4315 p.s.i.

Results of these tests clearly indicate that a concrete mixture designed for the use of representative

(Continued on page 113)

Fig. 11: Three slump test results. No. 1-57, left, had aggregate samples 1SG and a slump of 6¼ in.; No. 2-57, center, with aggregate samples 2SG had a slump of 7½ in.; and No. 3-57, right, with aggregates 3SG had a slump of 6½ in. Water-cement ratio was 0.57

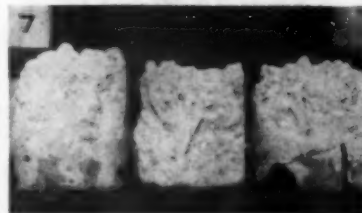


Fig. 7: Three cylinders of concrete subjected to strength tests. Cylinder 1-73, to the left, comprising aggregate samples 1G and 1S, had a water-cement ratio of 0.73, showed 2900 lbs. compressive strength at 28 days; cylinder 2-73, center, made from aggregate samples 2G and 2S with a water-cement ratio of 0.73 had a strength of 3430 lbs. at 28 days; cylinder 4-73, right, from aggregate samples 3G and 3S with a water-cement ratio of 0.73 had a strength of 3325 lbs. at 28 days. Another cylinder, not shown, 4-73, with the same aggregates as 3-73 cylinder but with 2.2 percent retained water and designed for a water-cement ratio of 0.73 but with an actual ratio of 0.905, had a 28-day strength of 2440 lbs.



Fig. 8: Concrete test cylinders. Cylinder 1-57, left, containing aggregate samples 1G and 1S had a strength at 28 days of 4455 lbs.; cylinder 2-57, center, containing aggregate samples 2G and 2S had a strength at 28 days of 4775 lbs.; and cylinder 3-57, right, containing aggregate samples 3G and 3S had a 28-day strength of 4315 lbs. Water-cement ratio was 0.57



Fig. 9: Slump tests of various aggregate samples. No. 1-73, left, with aggregates 1SG had a slump of 1½ in.; No. 2-73, center, with aggregates 2SG had a slump of 3 in.; and No. 3-73, right, with aggregates 3SG, had a slump of 1¼ in. Water-cement ratio in all three samples was 0.73. Fig. 10: No. 4-73 with aggregate samples 3SG was designed for a water-cement ratio of 0.73 but the actual ratio was 0.905 and had a slump of 7 in.



An Automatic Rock Dust Plant

Utah Lime and Stone Co. builds special plant for manufacture of limestone dust for dusting coal mines

COAL MINES in Utah, Wyoming, and parts of Colorado were confronted in 1942 with a shortage of rock dust for dusting the mines, and in their plight turned to the Utah Lime and Stone Co., Salt Lake City, Utah, to supply this highly essential material to reduce the explosion hazard. The bituminous coal mines in this area have found that the dusting of mine passageways and ledges with a limestone or dolomite dust is a very effective way of reducing the hazards of explosions and fire caused by coal dust and gas which are present in all mines. Limestone or dolomite dust with its low silica content does not have a tendency to cake and also has other desirable qualities.

An investigation by the Utah Coal Operators Association revealed that the Grantsville, Utah, quarries of the

Utah Lime and Stone Co., represented about the only available local source from which rock dust meeting the Bureau of Mines specifications could then be obtained. L. H. Hinkley, regional supervisor, Mining Branch, War Production Board, Denver, Colo., recommended the granting of the required priority ratings to procure pulverizing equipment and the Utah Lime and Stone Co., proceeded to build a special pulverizing unit at the Grantsville plant for this purpose.

Quarry Operation

The quarries of the Utah Lime and Stone Co. were opened in 1917 by the Ellerbeck interests and were modernized in 1936 to provide for increasing the output of flux stone for smelters, ground limestone for dynamite manufacture, limestone for the

sugar factories, lime for ore treating plants and other specialized products.

As shown in one of the illustrations, the Grantsville quarry has a face 200 ft. high with the limestone strata dipping 60 degrees from the horizontal. For blasting, 18-ft. holes are drilled with Gardner-Denver hand-held compressed air drills operated from either of two Gardner-Denver 230-cu. ft. capacity air compressors. The holes are sprung with 40 percent dynamite and then shot with 20 percent black powder. Loading of broken stone into 2½-cu. yd. dump trucks is done with a 1-cu. yd. Bucyrus-Erie electric shovel, a 1¼-cu. yd. Lorain gasoline shovel, and a new Bucyrus-Erie B-37 Diesel shovel.

Trucks from the quarry move up a ramp of waste rock fill and dump



Overall view of Grantsville, Utah, crushing plant. Primary crusher to the right, secondary crusher and screening station next in line, and final screening station and rock dust plant, to the left

GRINDING



To the left, bins from which $\frac{1}{4}$ -in. stone is fed by belt feeder to roller kiln mill in rock dust plant; center, three loading trucks with spouts above arranged to swing from one car to another; right, final screening station before material is conveyed to dust plant or to cars

to a hopper from which it is fed by a 42 in. by 10 ft. Stephens-Adamson apron feeder to a grizzly with bars set for a 4-in. spacing. Plus 4-in. stone goes to a No. 8 Gates gyratory primary crusher. Throughs from the crusher and the minus 4-in. material which has by-passed the primary crusher go to a hopper feeding a 30-in. belt conveyor, 80-ft. centers, that delivers the stone up an incline to a double-deck 3- x 8-ft. Tyrock screen, the top deck of which has 3-in. square openings and the bottom deck 2-in. openings. It will be noticed in the illustration that the primary crusher rests on a foundation at ground level alongside a concrete and masonry retaining wall for the ramp, an arrangement which simplifies the conveyor installation and makes the crusher more accessible.

Crushing and Screening Plant

Plus 3-in. stone from the Tyrock screen goes to a 24-in. belt conveyor, 75-ft. centers, which drops the stone to a stockpile for shipment to sugar refineries. Minus 3-in. plus 2-in. stone is crushed in a No. 7½ Gates gyratory crusher from which the product is chuted to a 30-in. belt conveyor, 140-ft. centers. Minus 2-in. stone by-passes the No. 7½ Gates crusher and joins the product of this crusher on the 30-in. belt conveyor which rises on an incline to a double deck, 3- x 6-ft. Simplicity screen having 2-in. and $\frac{3}{4}$ -in. openings. The plus 2-in. stone is crushed in a 10- x 20-in. jaw crusher, the product going to the boot of a 12-in. bucket elevator, 50-ft. centers. Minus 2-in.,

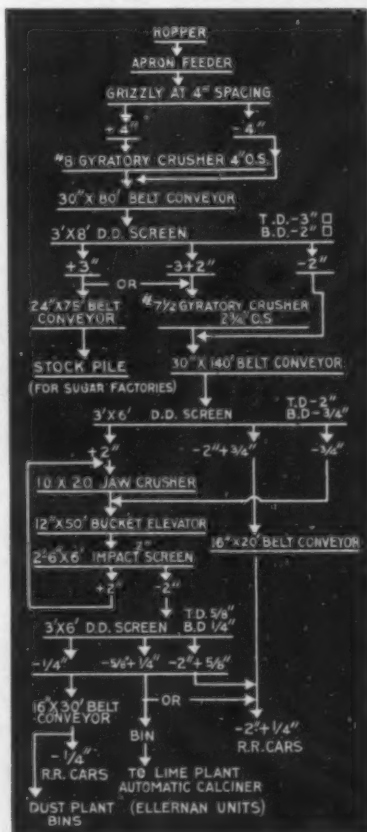
plus $\frac{3}{4}$ -in. is chuted to a 16-in. belt conveyor for handling direct into cars or to another double deck, 3- x

6-ft. Simplicity screen with $\frac{5}{8}$ -in. and $\frac{1}{4}$ -in. openings, respectively, for further sizing. Minus $\frac{3}{4}$ -in. from the first 3- x 6-ft. screen joins the product of the 10- x 20-in. jaw crusher and is raised by the bucket elevator from which it falls to 2-ft. 6-in. by 6-ft. impact screen with 2-in. openings. The oversize goes back to the jaw crusher and the throughs go to the second 3- x 6-ft. Simplicity screen, previously mentioned. At this screen the final sizing is carried out.

The minus $\frac{1}{4}$ -in. moves up an incline by 16-in. belt conveyor, 30-ft. centers, to a bin supplying the rock dust plant or it may be spouted direct to railroad cars. The minus $\frac{5}{8}$ -in. plus $\frac{1}{4}$ -in. goes to bins to supply the size stone used in the automatic calcining Ellernan kilns in the lime plant or is chuted direct to cars. Minus 2-in. plus $\frac{3}{4}$ in. goes directly to cars. It will be noticed in the illustration showing the three loading tracks that the minus 2-in. plus $\frac{1}{4}$ -in. stone and also the screened minus $\frac{1}{4}$ -in. material are loaded into cars by means of swing spouts. The spouts are swung from one car that is loaded over to the next car in line which is to be loaded. This does away with the need for bins to run into while cars are being changed.

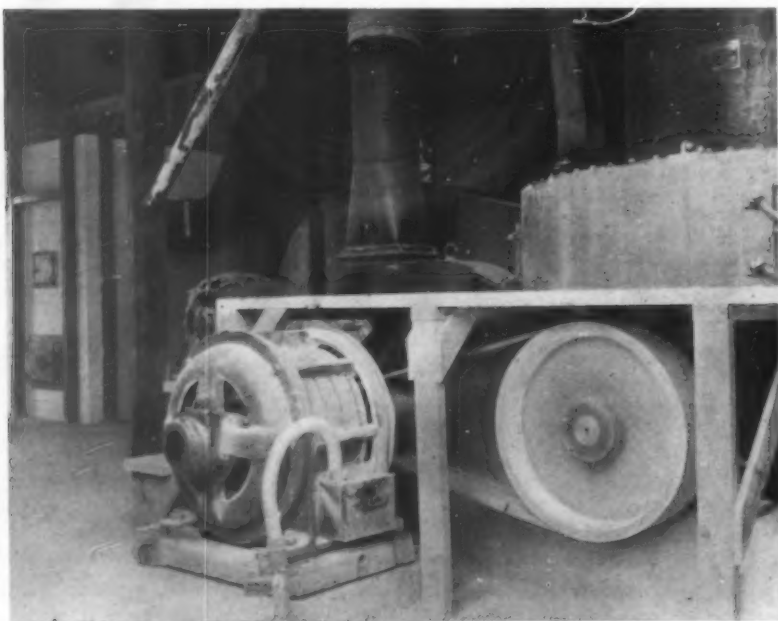
Rock Dust Plant

Bins adjacent to the rock pulverizing unit on the other side of the loading tracks are filled by belt conveyor daily and hold sufficient material to run the mill through the night. The feed from the bins is carried by a small 12-in. belt conveyor which is automatically controlled.



Flow sheet of crushing, screening, and grinding plant units

GRINDING



Roller mill has pneumatic feed control and double whizzer separator

When a small hopper over the mill feeder becomes full, the material swings an arm tilting a Mercoid switch which stops the 12-in feeder. When this small hopper becomes

nearly empty, the arm swings the opposite direction and closes another Mercoid switch which starts the belt feeder. Material is fed to a Raymond Hiscide roller mill having a pneu-

matic feed control and double whizzer separator. With this automatic feed of raw material, and the pneumatic mill feed, along with the thermostat control of the mill furnace stoker, the operation is practically automatic throughout and one man operates the entire pulverizing plant and also does the bagging and loading of the finished product.

Pulverized rock dust for the mines is packaged in 100-lb., multi-wall valve bags by means of a two-spout Bates packer. Capacity of the pulverizing plant is 72 tons per 24-hr. shift. The main crushing plant has a capacity of about 500 tons per 8-hr. shift.

Chemical analysis of the limestone dust shows a silica content of two percent and a calcium carbopate content of 95 percent. Screen analysis is 98 percent through 100-mesh and 84 percent through 200-mesh. Adjustments also can be made in grinding to provide a product with a fineness of 98 percent through 325-mesh.

Ample reserve supplies are available to provide material for the dust plant. In one of the illustrations a stockpile of 40,000 tons of minus $\frac{1}{4}$ -in limestone may be seen just beyond the dust plant. This supply may be drawn upon if sufficient $\frac{1}{4}$ -in. limestone is not being produced incident to the regular crushing plant operations.



Quarry to the left has a 200-ft. face. Truck may be seen, to the right, dumping from top of ramp fill into primary crusher. Dust plant in foreground

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Since that time, they have bought 28 installations, totalling 599 feet of actual filter length, making a total of 42 installations of 801 feet, capable of cleaning some 900,000 cubic feet of air per minute.

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Extend Research Activities

Directors meeting of National Lime Association held at Hot Springs, Va., May 16 to 18

AN OPEN MEETING of the board of directors of the National Lime Association was held in Hot Springs, Va., May 16, 17 and 18, chiefly to listen to progress reports on research work being done under association auspices, and to transact the regular business of the association, which, as of May 15, comprises 39 companies operating 44 plants with a total production in 1943 of 1,543,340 tons applicable to association dues.

Association Activities

S. WALTER STAUFFER, president and general manager of the association, reported in part as follows: Answering a criticism that the association was devoting too much research to structural lime, he said, in 1907 structural lime accounted for 60 percent of the production of the industry, and in 1941 only for 20 percent. While uses and demand for chemical lime increased during the intervening years, substitute materials reduced the demand for structural lime. Mr. Stauffer held the loss of this market was due to unwillingness of the lime industry to match the aggressive promotional efforts of its competitors—the cement and gypsum industries. He thought a post-war construction prospect of 12 to 14 billion dollars a year justified a special effort on structural lime.

The most progress to date, through research work at the Massachusetts Institute of Technology, has been toward a greater use of lime in mortars. New specifications soon to be adopted, in all probability, will call for a 1 cement, 2 lime and 8 or 9 sand mix. When this work began 15 years ago, the common specifications called for 1 part cement, not more than 0.15 part lime, and 3 parts sand. The tangible results represent almost 550,000 tons of lime.

In the chemical or industrial lime field, President Stauffer said the association staff had devoted much time to helping producers with priorities and the W.P.B. with getting emergency supplies of lime. Demand for the association's booklets, "Water Supply and Treatment," and "Principles of Sewage Treatment" continues large, and Mr. Stauffer attributes much of the notable increase in lime tonnage to the wide distribution of these treatises.

Agricultural lime demand kept pace with the increasing demand for liming materials generally, Mr. Stauffer said. "The association," he continued, "has cooperated fully with the War Food Administration on the food program. We have attended every meeting of the Industry Advisory Committee and have furnished needed statistics and information on production and current supplies. In the absence of our agronomist, we have secured technical advice through ar-

rangement with the Quality Lime Institute (a group of Eastern lime manufacturers) and have kept the industry advised on important developments."

Mr. Stauffer said the good results of association work were not confined to member companies, and the chief present problem of the association is to interest more producers in support of association efforts.

PROF. HOWARD R. STALEY, Massachusetts Institute of Technology
(Continued on page 108)



Seated around the table at the Board of Directors' meeting, National Lime Association; the time about midnight. Left to right: Walter Stauffer, president, National Lime Association; Dr. D. J. Fink; W. V. Brumbaugh, secretary; and Dean Crandell, National Gypsum Co., in technical session



One of the frequent get-together sessions. Left to right: H. D. Brigstocke, vice-president, Thomasville Lime and Stone Co.; John F. Gruber, Valve Bag Co.; and Burton Ford of St. Regis Paper Co.



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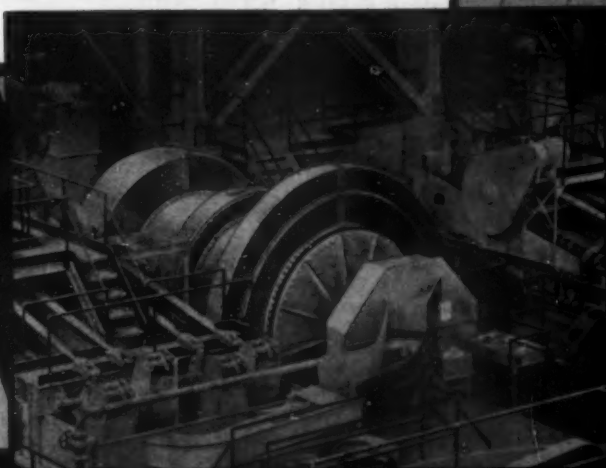
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NEW YORK, N. Y.



By E. J. LINTNER

Preparation of mica for market is the subject of the second and concluding article about this vitally important mineral

This North Carolina mica peeler is holding two sheets of run mica. Value of the mica is increased with the size of the sheet

MICA—A War Essential Mineral

MICA coming from the mine is usually in irregular masses and is commonly referred to as "run-of-mine," "book," or "block mica." The rough books are first "cobbled" with a small hand hammer to remove all adhering rock and dirt. As it is being cobbled, the books are examined closely and defective blocks are discarded as scrap.

IMPERFECTIONS IN MICA:

Flat unstained mica is the most valuable. Much of the mine run material contains imperfections which must be removed by careful splitting and grading of the books. Therefore mica is generally characterized by the various structural imperfections present such as "ruled," "ribbon," "wedge," "A," "hair-line," "herring-bone," "fishbone," "horsetail," "feather," and "tangle sheet."

"Ruled" mica contains planes of separation other than the regular cleavage planes. "Wedge" mica is a term applied to those books that are thicker on one side than on the other. The other terms describe structural conditions that were probably caused by pressure on the mica crystals during or subsequent to crystallization. This pressure caused striations that assume various shapes or designs. In this manner a large quantity of mica

is ruined and has little commercial value.

IMPURITIES:

The most common impurities found in mica are oxides of iron, silica, and clay stains. These impurities no doubt infiltrated in the cleavage planes after first having been opened through bending or distortion of the crystal by earth movements. Crystals of garnet and black tourmaline are also quite common.

Air bubbles widely distributed between the laminae are another common inclusion that ruins otherwise excellent mica as they render it unsuitable for most commercial work.

RIFTING:

The cobbled mica is now passed to the "rifiers" where it is split into sheets about 1/16 in. or less in thickness. This is done by means of a heavy, double-edged knife having a 3-in. blade with a V-point. Considerable judgment and skill are necessary in splitting the blocks to the best advantage so that all imperfections are removed and thus obtain the maximum yield of high-grade mica. The product of the rifiers consists of sheet, and punch or washer stock. The former passes to the trimmers while the latter is sent to the punch machines.

TRIMMING:

Trimming consists in removing the ragged edges of the mica sheets. This may be done in several ways but is generally accomplished with a short heavy knife having a hooked blade. The knife is held at a low angle with the face of the sheet and pulled towards the operator, thus producing a bevel edge. This type edge presents a broad surface for splitting and also assists the splitter in quickly gaging the relative thickness of the sheets to be split. Trimming naturally produces a large percentage of scrap mica.

Finished sheets are carefully graded or sorted for size and quality and placed in suitable containers. Sheets may be circular, curved, rectangular, or any complex design.

Standards and Sizes

To assist in the grading the operator has lying before her a chart containing a superimposed rectangular outline of the various sizes. The position of the mica sheet is shifted until its area completely covers the largest rectangle. Only the three sizes trimmed from punch, 6, 5½, and 5 are graded according to India standards. All other sizes are graded according to our domestic standards.

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The standards of quality shall be the generally accepted trade standards.

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Minimum thickness of sheet mica shall be .007 in.

GRADE: (size)

The grade or size of a piece of mica shall be the size of the largest rectangle, free of cracks, reeves and cross grain, that can be cut from the piece; subject to the following minimum widths and area permissible in each grade (size).

Grade (Size)	Minimum Width	Minimum Area
1 x 1 in.	3/4 in.	1 sq. in.
1 1/4 x 1 1/4 in.	3/4 in.	1 1/2 sq. in.
1 1/2 x 2 in.	1 in.	3 sq. in.
2 x 2 in.	1 in.	4 sq. in.
2 x 3 in.	1 1/2 in.	6 sq. in.
3 x 3 in.	1 3/4 in.	9 sq. in.
3 x 4 in.	2 in.	12 sq. in.
3 x 5 in.	2 1/2 in.	15 sq. in.
4 x 6 in.	3 in.	24 sq. in.
6 x 8 in.	3 in.	48 sq. in.

TRIM:

All sheet mica shall be trimmed with beveled edges. The total area of any piece of sheet mica purchased under these schedules must not be greater than 2 1/2 times the area of the largest rectangle, free of cracks, reeves or cross grain, that can be cut from the piece.

Nine different types of mica were used in condensers. Six of these were of domestic origin and three foreign. These were first tested on the new Bell instruments and the results were

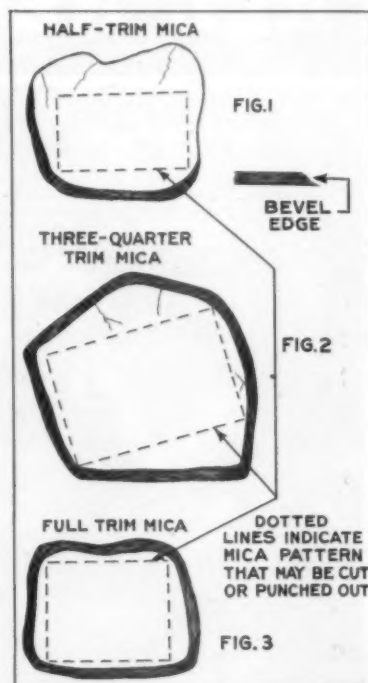
favorable. The six types of mica chosen are all included in the present buying program of the Colonial Mica Corporation. The quantity tested weighed nearly 3000 lbs. Each of these types of mica were distributed among a number of manufacturers to be made up into certain specified condensers.

In addition to this study now being conducted, the American Society for Testing Materials is considering tentative specifications covering natural block mica for use in condensers. To meet the specifications under consideration, the mica must give favorable results on the Bell instruments for power-loss and absence of conducting veins or spots. In addition various visual and physical standards such as flatness, splitability, hardness, freedom from cracks and pinholes must be met.

It must be remembered that these new instruments determine only the electrical quality of mica. Equally important in determining the usefulness of any mica are its physical qualities which must still be appraised visually. It has been found that some types of mica which the instruments indicate as satisfactory for condenser use cannot be used because of physical defects such as excessive waviness, softness, presence of minute rock inclusions, and other similar defects. The instruments do not take these into account, and there is no method other than visual inspection by which such defects can be judged.

Outlook

The stockpile of strategic mica of the better qualities has declined sharply since January 1, 1943. The



How mica is cut for commercial use

average consumption of good stained and better quality mica for the first eight months of 1943 has been greatly in excess of receipts. This consumption has existed for such a length of time that government stocks of certain types of mica used in capacitors are practically at the vanishing point, and industrial stocks are also at a minimum possible working inventory.

The following types and sizes are the most critical: No. 4 clear and slightly stained block; No. 5 fair stained block and film; No. 5 1/2 fair stained block and film; and No. 5 1/2 good stained block. These sizes are used almost exclusively for condenser films. The deficiency of these types has compelled the Mica-Graphite Division of the W.P.B. to draw on other types of mica as substitutes. Moreover, it is only a matter of time before other types will likewise be so low that all demands made for mica cannot be met. Up to the present time all requests for allocation have been filled and in no instance has any necessary war production been delayed due to inability to make delivery. This critical shortage has led to a change in the allocation policy whereby only sufficient mica, of present accepted condenser quality, will be provided manufacturers to maintain consumption at the average rate they enjoyed for the first nine months of the year.

These restrictions apply only to good stained block mica or better, and to film of second quality or better. No restrictions apply to the lower

(Continued on page 114)



Mica sheets are so clear they may be used as a mirror for the young lady to apply lip-stick



There is a Barber-Greene to meet your material handling problems—from pit or quarry to stockpile to truck to processing plants. Portable and Permanent Conveyors of standardized sectional construction for rapid set up and easy alteration. Bucket Loaders for high capacity, low cost loading of trucks from ground storage. Write for literature.



PORTABLE CONVEYORS

LEFT: 60' B-G Belt Conveyor mounted on swivel truck stockpiling from portable crushing plant in gravel pit.

BUCKET LOADERS

CENTER: B-G 552 Bucket Loader loading truck from processing plant stockpile. Feeding spirals give B-G Loader excavating ability and positive feeding of buckets.

PERMANENT CONVEYORS

Top photos show B-G Permanent Belt Conveyor used to supply aggregate to bin for batching to ready mix trucks. Raw aggregate is dumped into feeding hopper at right by trucks and B-G Conveyor elevates aggregate to bin.

44-23

BARBER-GREENE

AURORA, ILL.

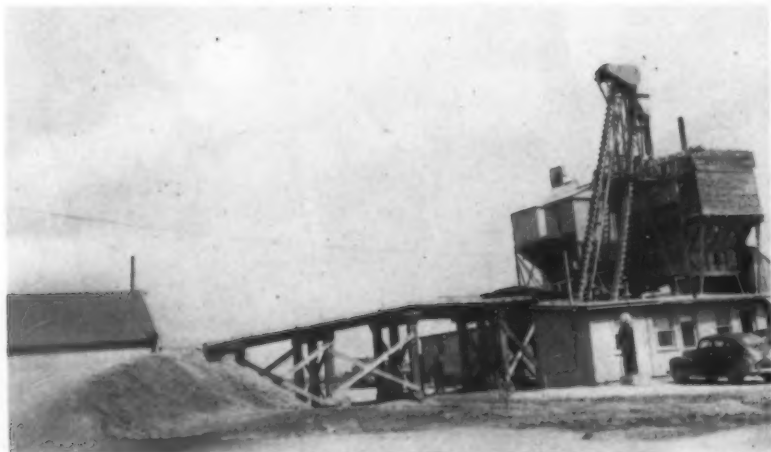
LET'S ALL BACK THE ATTACK



ROCK PRODUCTS, June, 1944

77

Batching



Timber and fill ramp leads up to ready mixed concrete batching plant

By JAMES A. TWYMAN

Central States Construction Co., Osborn, Ohio, supplies ready mixed concrete for big army air fields

Speeding Up Concrete for Airports

WAR'S IMPACT was immediately felt in the area surrounding Dayton, Ohio. Many changes had to be made quickly at both Wright and Patterson Fields, the final inspection points of the planes and equipment in the services of the Army Air Forces, combatant arm, and the Air Service Command, operating the vast air transport system all around the world. New runways, new hangars, new aprons, new roads, new laboratory and office buildings, all to be built of concrete, were needed to meet the requirements of this new kind of war.

To meet this need many innovations have been tried. Among them is the in-line ready mixed plant of the Central States Construction Co. at Osborn, Ohio, situated along the eastern boundary of Patterson Field.

The plant is on a $\frac{3}{4}$ acre site and fenced. Trucks from the company owned gravel pit supply the ready mixed concrete plant with sand and $\frac{3}{4}$ in. and $1\frac{1}{2}$ in. gravel. Since the plant is erected along a railroad siding to receive cement in bulk cars, the narrow lot sets a limit on the movement of the gravel trucks. This was overcome by constructing a fill approach to a 12-ft. wooden trestle ramp. The combined length of the ramp trestle and fill is 120 ft., curved to meet the limited space conditions between the plant and a city sidewalk and street. The curved ramp has a seven percent grade. The loaded trucks back up the ramp and dump into a hopper where a Jeffrey bucket belt elevator, rising to a height of 45 ft., and powered by a 15-hp. Master motor, fills the batching plant aggregate bin.

These $7\frac{1}{2}$ - x $11\frac{1}{2}$ - x 14-in. Jeffrey buckets will put a 7-ton load in the bin in three minutes. A man, standing on the unloading platform, uses a hand rope to guide the chute above the bin and distribute the materials into bins.

Ramp and hopper are set high to keep water out of the concrete boot pit. Since there is no drainage in the area the boot pit would soon fill with water. Conveyor screws from the bulk car hoppers are also above ground for this reason.

The batching plant, consisting of a three-compartment, 110-ton, Blaw-Knox aggregate bin, a 300-bbl. Blaw-Knox cement bin, and a 250-bbl.

Heltzel high-early-strength cement bin, all set up on a straight line, provides minute-and-a-half service for a fleet of 10 transit mixers. A catwalk between the bins permits one operator to do the loading. Mixing takes place between the plant and the job—a matter of minutes. Water from city mains is weighed out and flows by pipe into the mixer truck drum. A Blaw-Knox water measuring tank is used with the water weighed out on a manually-operated beam scale.

The mixer fleet consists of three high-dump, 2-cu. yd., Rex mixers on Ford chassis, two $2\frac{1}{2}$ -cu. yd. Jaeger

(Continued on page 82)



Left: Dumping aggregates into hopper for elevation by bucket elevator. Right: End view of batching plant showing ready mixed concrete truck pulling out with load

★
Machines like this for applying Rip-Cord closures to cotton valve cement bags enable one operator to sew and bundle over 1000 bags an hour. The conveyor, synchronized with the sewing speed, carries bags through the machine and automatically stacks and counts them.



Bemis Rip-Cord Closure makes cotton cement bags go further

EXPERIENCE of cement manufacturers shows they get greater mileage from cotton bags after adopting the Bemis Rip-Cord Closure. In many cases the number of trips per bag has been increased from 8 to 12... an increase of 50% in the life of the bag.

Rip-Cord-closed bags deliver this extra service to cement manufacturers because neither closing nor opening damages the fabric.

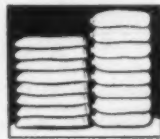
More trips per bag is only one of the economies of using the Rip-Cord Closure. The original cost of bags is less than when made for wire tie closing because bags can be made smaller and without hems. Efficiency in filling is stepped up. There are added savings in handling... in storage and shipping space. Mail the coupon today for complete details on the efficient, economical Bemis Rip-Cord Closure.



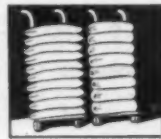
Saves Money! With Rip-Cord Closure bags can be made smaller and without hems and their life is increased, thus reducing costs.



Saves Bags! The Rip-Cord Closure is so easy to open—no tools are required and workmen never need damage bags to remove contents.



Saves Space! Bags closed with Rip-Cord are uniform in size and shape, saving shipping and storage space. Both stacks contain same amount.



Saves Time! More Rip-Cord closed bags can be put on a truck. This means fewer trips for workmen when loading, unloading, storing.

**Free Sample
AND LITERATURE**



Investigate the economy, added efficiency and sales advantages of the Bemis Rip-Cord Closure. A sample of the Rip-Cord Closure and descriptive folder will be sent promptly upon request.

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Designing Portland Cement Clinker

Simplify calculations involved in maintaining a fixed design for strength and MgO content of portland cement clinker

By C. J. KNICKERBOCKER

TO SIMPLIFY the calculations involved when introducing a high MgO material with those normally used and maintaining a fixed design for strength and MgO content, the following method has been worked out:

The procedure consists of securing a tentative design for the proposed ratio of calcium silicates and, with this limiting value, establishing the ultimate proportions of raw materials required. Solution is effected by substitution in either of two final sets of equations. Since determinants of order higher than third cannot be solved from a general type equation, the method set forth here appears to be most suited for the purpose intended.

Procedure

The CaO/SiO₂ ratio in the calcium silicates is found by substitution of the desired C₂S/C₃S ratio in Eq. (1).

Substitution of the analytical values for each material in Eq. (2) gives values which, when equated with respect to their signs, determine the material proportions. Three component mixes being considered, there will be two combinations.

Two of the materials being of like characteristics, either basic or acidic, and one of high MgO content, the material common to each mix is designated as "C," the high MgO material as "B" and the third as "A," materials "A" and "B" being of similar sign.

The above proportions are converted to an ignited basis by means of Eq. (3a) and (3b).

The raw MgO values are similarly converted by means of Eq. (4).

These two steps eliminate converting all three complete analyses to an ignited state as is commonly practiced.

The data is assembled for reference, as below:

a—% ignited MgO in A.
b—% ignited MgO in B.
c—% ignited MgO in C.
m—% clinker MgO.

p—parts A to one C—raw.
p'—parts A to one C—ignited.
q—parts B to one C—raw.
q'—parts B to one C—ignited.

Substitution of the above values in Eq. (5) to (8), in order, gives the raw material proportions. Negative values indicate impracticability of design except in the solution of Eq.

amples (1) and (2) being solved by the former set of equations.

Eq. (11) may be used to verify the value obtained for X, and Eq. (9) and (10) for comparing design silicate ratios with those of the clinker obtained.

Examples (1) and (2) are ade-

Equation (1)

$$\text{CaO/SiO}_2 = R = \frac{2.8 (\text{C}_2\text{S/C}_3\text{S}) + 2.48}{(\text{C}_2\text{S/C}_3\text{S}) + 1.33}$$

Equation (2)

$$\text{CaO} - ((1.65\text{A}1203) + (0.35\text{Fe}_2\text{O}_3) + (\text{R SiO}_2))$$

Equation (3)-a

$$\text{Parts A/1.00} - \text{ignition loss}$$

Mix AC conversion

$$\text{Parts C/1.00} - \text{ignition loss}$$

Equation (3)-b

$$\text{Parts B/1.00} - \text{ignition loss}$$

Mix BC conversion

$$\text{Parts C/1.00} - \text{ignition loss}$$

Equation (4)

$$\% \text{ MgO/1.00} - \text{ignition loss}$$

Equation (5)

$$X = \frac{p^2 + 1 ((q'b) + c - m (q' + 1))}{q' + 1 (m (p' + 1) - ((p'a) + c))}$$

Equation (6)

$$\% \text{ A} = 100\text{Xp/X} (p + 1) + q + 1$$

Equation (7)

$$\% \text{ B} = 100\text{q/X} (p + 1) + q + 1$$

Equation (8)

$$\% \text{ C} = 100 (X + 1)/X (p + 1) + q + 1$$

Equation (9)

$$R = \frac{\text{CaO} - (1.65\text{A}1203 + 0.35 \text{Fe}_2\text{O}_3)}{\text{SiO}_2}$$

Equation (10)

$$\text{C}_2\text{S/C}_3\text{S} = (2.48 - 1.33\text{R})/(\text{R} - 2.8)$$

Equation (11)

$$\% \text{ MgO} = \frac{X \left(\frac{p'a + c}{p' + 1} + \frac{q'b + c}{q' + 1} \right)}{X + 1}$$

Equation (12)

$$\% \text{ A} = p' \left(\frac{(m-c) + q' (m-b)}{p' (a-m) + q' (m-b)} \right) \times \frac{100 - \% \text{ loss}}{\text{sum of parts}}$$

Equation (13)

$$\% \text{ B} = q' \left(\frac{p' (a-m) - (m-c)}{p' (a-m) + q' (m-b)} \right) \times \frac{100 - \% \text{ loss}}{\text{sum of parts}}$$

Equation (14)

$$\% \text{ C} = 1 \times (100 - \% \text{ loss}/\text{sum of parts})$$

(2). To obtain raw mix and clinker totals of unity conversion to that basis may be made with no regard for the raw material proportions.

An alternate solution may be made by means of Eq. (12), (13) and (14), Example (3) being so solved, Ex-

quately explained whereas Table (3) alone is given with Example (3). Example (3) indicates the adaptability of the method for securing an approximate design for values other than MgO, in this case a zero C₂A content. Equation (2) may be modi-

TYPICAL DIESEL LUBRICATION PROBLEMS:

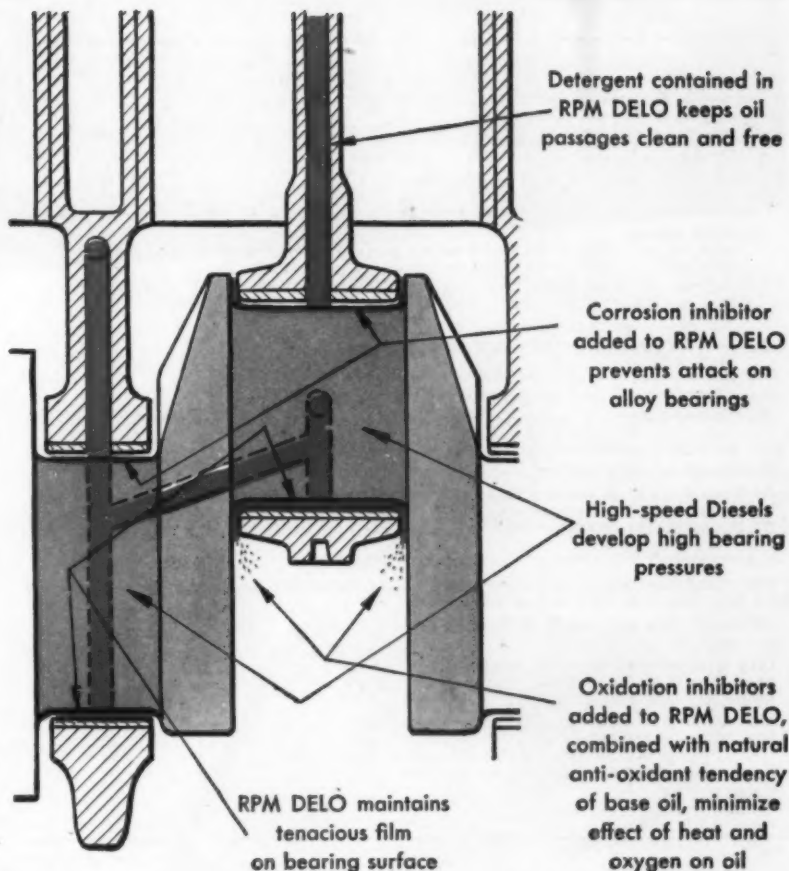
2. Bearing Corrosion

The high speeds of automotive Diesel engines have increased the loads on bearings to such an extent that copper-lead and other alloy bearings are widely used. These bearings, although able to withstand far greater pressures and higher temperatures than the conventional babbit type, are subject to corrosion.

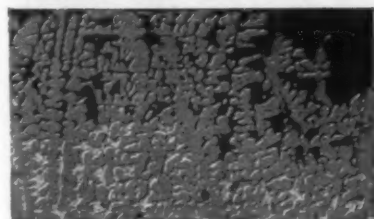
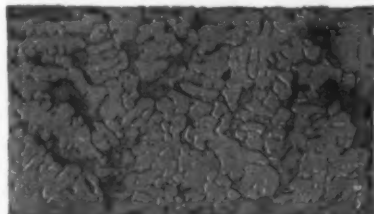
These same conditions of pressure and temperature promote a reaction between the lubricating oil and the air in the crankcase. When a hydrocarbon lubricating oil is exposed to oxygen at elevated temperatures, the oxygen atoms combine with the oil molecules. With some lubricating oils, this reaction causes them to become corrosive.

The products formed in this reaction tend to dissolve the lead in the copper-lead structure of the bearing, leaving a porous copper shell which breaks down under pressure.

This tendency, which presents a serious problem to operators of high-speed Diesels, can be entirely overcome



Diagrammatic sketch of connecting rod and crankshaft bearing assembly illustrates one section of engine where RPM DELO reduces overhaul and repair expense.



Top Photo: A photomicrographic cross-section shows the lead component of a new copper-lead bearing in light grey. The copper is shown as red. Note the even distribution throughout.

Bottom Photo: A similar cross-section corroded by use of straight, un compounded mineral oil. Note how lead has been eaten from surface, leaving copper honeycomb.

through use of RPM DELO in accordance with the recommended procedure.

RPM DELO, in addition to its other properties, prevents bearing corrosion in three separate ways:

1. The base stock of RPM DELO contains natural inhibitors which are highly resistant to oxygen, and minimize the original tendency of all mineral oils to oxidize under heavy-duty conditions.
2. A powerful oxidation inhibitor is added to RPM DELO, which further reduces the rate at which the oil absorbs oxygen.
3. Direct protection is given to the

bearing by the corrosion inhibitor added to RPM DELO.

Even more important than its non-corrosive property, is the ability of RPM DELO to eliminate ring-sticking, prevent excessive deposits on rings and ports, and minimize ring and cylinder wear.

RPM DELO has world-wide distribution and is marketed under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial RPM DELO (concentrate). Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity.



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EXAMPLE (1)

Given the analyses of the three materials of Table (1), proportion to a clinker of 4.0% MgO and C₂S/C₃S ratio of 1.5.

Designate marl as (A), stone as (B) and clay as (C).

R is 2.36 by Equation (1).

Marl has CaO excess of 46.9 by Equation (2).

Stone has CaO excess of 39.4 by Equation (2).

Clay has CaO deficiency of 153.9 by Equation (2).

Equating above:

Mix AC C/A = 153.9/46.9 or 3.3 parts A to one C.

Mix BC C/B = 153.9/39.4 or 3.9 parts B to one C.

Igniting above by Equation (3)-a and b:

Mix AC = 5.5.

Mix BC = 6.2.

Igniting MgO values by Equation (4):

Marl = 1.1.

Stone = 5.0.

Clay = 3.0.

Tabulating data:

(a = 1.1), (b = 5.0), (c = 3.0), (m = 4.0).

(p = 3.3), (p' = 5.5), (q = 3.9), (q' = 6.2).

By Equation (5) X = 0.321.

By Equation (6) % marl = 17.

Equation (9) R = 2.36.

By Equation (7) % stone = 62.

Equation (10) C₂S/C₃S = 1.5.

By Equation (8) % clay = 21.

% MgO = (Unity total).

EXAMPLE (2)

Given the analyses of the three materials of Table (2), proportion to a clinker of 3.5% MgO and C₂S/C₃S ratio of 3.0.

Designate clay as A, shale as B and stone as C.

R = 2.51.

Clay has CaO deficiency of 164.22.

Shale has CaO deficiency of 72.13.

Stone has CaO excess of 37.17.

Mix AC or p = 0.227; a = 2.2%; % clay = 16.0.

Mix BC or q = 0.515; b = 10.6%; % shale = 4.6.

p' = 0.148; c = 3.4%; % stone = 79.4.

q' = 0.404; m = 3.5%; X = 7.8.

C₂S/C₃S = 2.9.

% MgO = 3.5.

TABLE (1)

Analysis				Proportioned			Slurry	Clinker
				X (0.17)	X (0.62)	X (0.21)		
%	Marl	Stone	Clay	Marl	Stone	Clay		
SiO ₂	1.3	3.5	59.8	0.221	2.170	12.558	14.95	23.4
Al ₂ O ₃	.8	.7	11.4	.136	.434	2.394	2.96	4.6
Fe ₂ O ₃	.4	.3	5.6	.068	.186	1.176	1.43	2.2
CaO	51.4	48.9	8.0	8.738	30.318	1.680	40.74	63.6
MgO	.6	2.9	2.7	.102	1.798	.567	2.47	3.9
Loss	45.2	42.5	9.5	7.684	26.350	1.995	36.03	
Total	99.7	98.8	97.0				98.58	97.7
C ₂ S/C ₃ S = 1.5.		R = 2.36.		MgO = 3.9.				

TABLE (2)

Analysis				Proportioned			Slurry	Clinker
				X 0.16	X 0.046	X 0.794		
%	Clay	Shale	Stone	Clay	Shale	Stone		
SiO ₂	62	23	3	9.92	1.06	2.38	13.36	20.65
Al ₂ O ₃	10	20	3	1.60	.92	2.38	4.90	7.57
Fe ₂ O ₃	6	4	1	.96	.17	.79	1.92	2.94
CaO	10	20	50	1.60	.92	39.70	42.22	65.25
MgO	2	8	2	.32	.37	1.59	2.28	3.52
Loss	10	25	41	1.60	1.15	32.55	35.30	
Total	100	100	100	16.00	4.60	79.40	99.98	99.93
C ₂ S/C ₃ S = 2.9.		R = 2.505.		MgO = 3.5.				

TABLE (3)

Analysis				Proportioned			Slurry	Clinker
				X .1675	X .0093	X .8232		
%	Sand-stone	Iron Ore	Lime-stone	Sand-stone	Iron Ore	Lime-stone		
SiO ₂	82	9	3	13.735	.084	2.470	16.29	25.55
Al ₂ O ₃	3	1	1	.502	.009	.823	1.33	2.09
Fe ₂ O ₃	5	87	1	.837	.809	.823	2.47	3.87
CaO	3	..	48	.503	..	39.514	40.02	62.78
MgO	1	..	3	.167	..	2.470	2.64	4.14
Loss	5	2	43	.837	.019	35.398	36.25	
Total	99	99	99				99.00	98.43
C ₂ S/C ₃ S = 1.0.		R = 2.27.		Fe ₂ O ₃ /Al ₂ O ₃ = 1.85.		C ₂ F = 1.0.		

(Continued from page 80)

fled to meet problem requirements.

The exactness with which the calculations need be made may be governed by the knowledge of raw material variations, proportioning and blending facilities available, adequacy of laboratory control and specifications under which product is to be made.

Batching

(Continued from page 78)

low-dump mixers on White chassis, one 1½-cu. yd. Jaeger high-dump mixer on a Ford chassis and four high-dump 3-cu. yd., Rex mixers on International chassis.

The plant was once owned by L. C. Aleshire of Springfield, Ohio, who erected it along a railroad siding at a site in Wright Field. The plant was in operation there for more than a year and had a daily production of from 400 to 800 cu. yd., but in August, 1943, Mr. Aleshire moved it to its present location in Osborn and sold it to the Central States Construction Co.

Central States Construction Co., with the home office in Crosby, Minn., operates several large plants in various parts of the country. It is one of the several unrelated interests of E. W. Hallett, its president. The company came to the Dayton area at the suggestion of a contractor working on the new runway at Patterson Field. The job called for 165,000 cu. yd. of concrete. A similar runway was under construction at Wright Field and showing greater progress. Impatient Army engineers quickly realized that sand and gravel deliveries were slowing up the Patterson Field project.

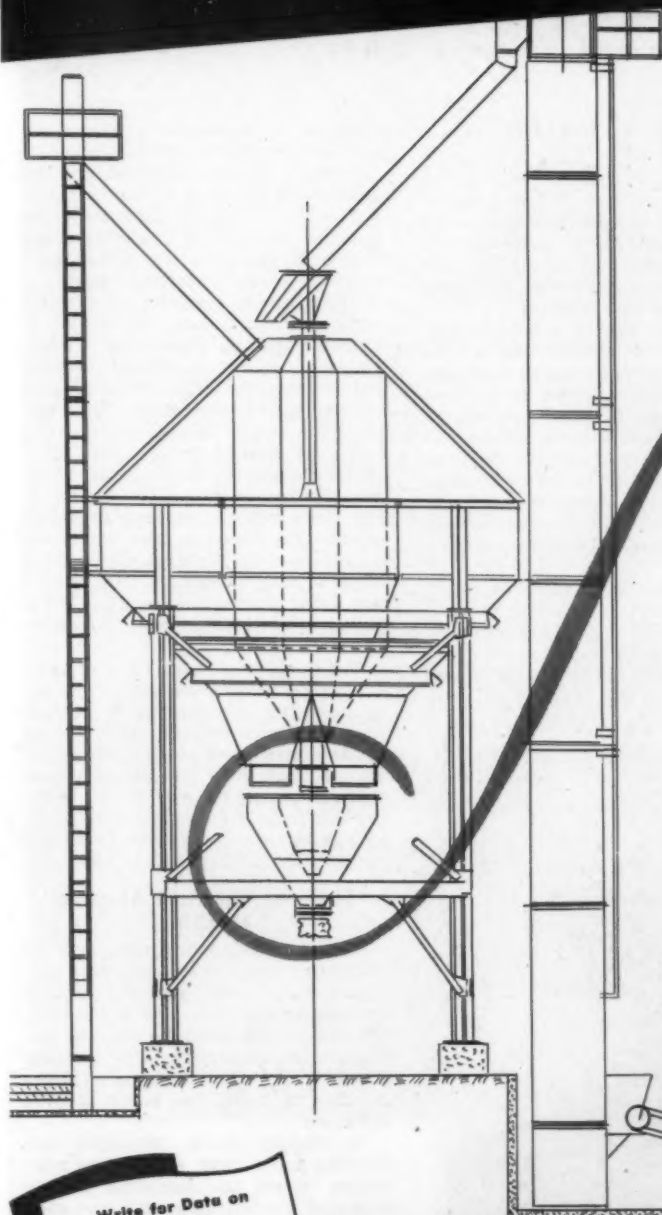
Central States came in and began operations on a deposit just beyond the north limits of the field. Using a Lippmann gravel plant and a system of belt conveyors fed by draglines, the company produced at high speed all during the summer and fall of 1943. Operating night and day, the plant accumulated huge stockpiles, more than enough to supply the runway job, and suspended operations before winter set in. Most of the operating equipment was dismantled and taken to other jobs.

These stockpiles, now supplying the ready mixed plant, have been standing all winter and spring. Since 90 percent of the output of the ready mixed concrete plant is used in government work, an inspector makes moisture tests at regular intervals. It is interesting to note that the 3 percent moisture rate has not varied for many weeks.

R. N. McGiffert is general superintendent of both the gravel operation and the ready mixed concrete plant.

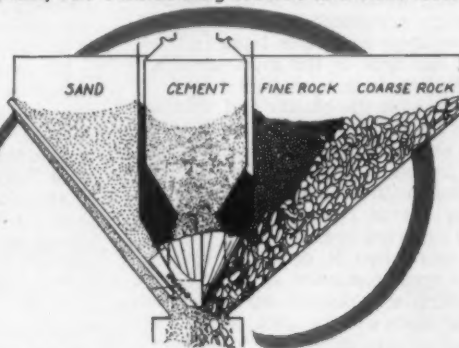
From BOULDER DAM TO TVA's FONTANA

One or More Johnson Mixing Plants Proportioned Material on Practically Every Major Project



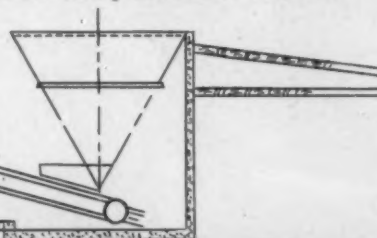
The selection of Johnson Central Mix Plants to handle more than sixty million yards of concrete on more than 31 major projects is practical evidence of The C. S. Johnson Company's qualifications to handle the planning and construction of any Mixing or Batching Plant... regardless of size or location.

While there are many individual factors that have to be considered in the planning of each plant, one outstanding feature is a vital factor in



the efficiency and economy of all Johnson installations. This is the patented concentric aggregate-cement batcher illustrated above.

Among the many important advantages to the user of this distinctive Johnson Batchers are (1) Intermingling of aggregates with cement when discharged, which assures a 20% pre-mix and pre-shrinkage. This provides a full capacity mixer charge; (2) Elimination of gumming and excessive wear by prevention of any large amount of cement touching wet mixer walls; (3) Reduction of cement dusting; (4) Elimination of the use of screws, chutes or other mechanical means of bringing the cement to the mixer. Write for outstanding features and performance records.



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PLANTS
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CHAMPAIGN - ILLINOIS

Testing Electric Blasting Machines

Regular schedule of maintenance, lubrication and testing of blasting machines prevents misfires and promotes safety

ONE of the most faithful pieces of equipment, to be found around a stone quarry, is the common blasting machine. In appearance, it is usually nothing but a small wooden box with a handle extending out of the top, which when pulled up, will be found connected to a rack bar. Of course there are other types but the rack bar type is the most common.

This machine is usually found on the job with the blaster and while in some cases it receives the best of care and attention, it can usually be seen standing in a corner or lying around until needed and then, when taken out to fire a blast, it is always expected to do its work, without fail and when it does fail, worries begin and production stops until the mis-fires are cleared up and shot. Sometimes, when a shot fails to go off or a part misses, serious delays and injuries result, while the trouble is being found and corrected. In the

*Asst. Gen. Supt., New York Trap Rock Corporation, Newburgh, N. Y.

By L. F. MILLER*

end, if the machine is found to be at fault, it is immediately sent away for repairs and if a spare is not available, much time is lost on the job while the blaster or his employer is trying to locate another.

No attempt will be made in this discussion to tell anyone that a particular type or make machine should be used or that a certain method of cap connection is recommended, as these subjects are thoroughly covered in any blaster's manual, but the purpose is to endeavor to show the simplicity of testing blasting machines and of knowing that they are always in first class condition, before a blast is made.

Any machine manufactured today can be depended upon to do the work for which it is recommended, providing it is kept in good working order but since these machines are so dependable, the practice in most

cases, is to wait until a failure occurs before any attempt is made to determine its condition and find out whether or not it is in proper working order and really generating the required amount of power to properly heat and melt the bridge wire, found in electric blasting caps.

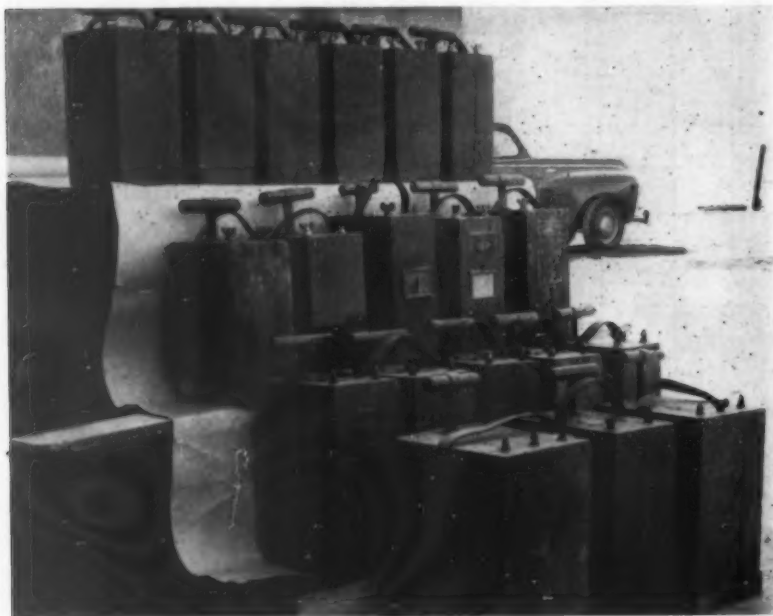
The current required to fire the ordinary electric cap is about $\frac{1}{2}$ ampere and to push this current through the circuit, about $1\frac{1}{2}$ volts are required for each cap used in a regular series connection. To determine the minimum voltage that can safely be used in firing a shot, it is only necessary to multiply the number of caps connected in series, by one and one-half, allowing an ample amount for losses in lead wires and connections. It is always advisable to allow a safe margin in this respect and never work a machine to its extreme internal capacity, regardless of size.

For example, a manufacturer rates a machine as a 50-cap size. In determining this size they have allowed a safe margin and the machine can be depended upon to fire this number of caps, even though its actual capacity might far exceed this number but to go over the rated capacity of a machine is a very simple method of inviting trouble and delays.

How to Operate Blasting Machine

In order to properly care for and maintain these machines, the following suggestions are offered in a very simplified form and if followed, the life of the machine may be extended for an indefinite period and it may be depended upon at all times to do the work for which it was intended.

In design, these machines are nothing more than an electric generator. When the operating handle is pulled out its full length and suddenly pushed down, electricity is produced in the same manner as in the big generators found in any power house, only on a much smaller scale. When the operator starts the handle on its downward stroke, the armature starts rotating and current is produced. As the stroke continues, more speed is attained and the rota-

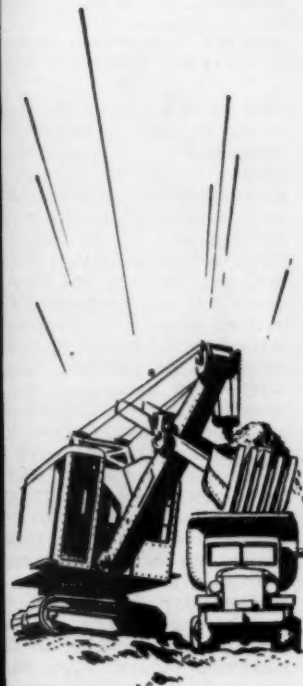


Some of the blasting machines tested are shown in this group. These machines are of many types and makes. Even old machines delivered full power after cleaning and oiling

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Connections used in making ammeter test. Either a low reading ammeter of 3- to 5-amp. scale, d.-c. or an ordinary 5-amp. full scale reading a.-c. meter will be satisfactory

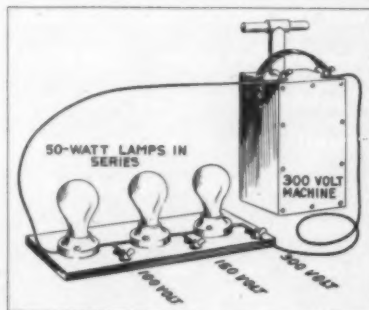
tion increased until the end of the stroke is reached, where the maximum amount of electricity is being generated and the voltage is at its peak. Since a certain amount of current is required to fire a cap, the power generated on the downward stroke is confined within the machine until the maximum has been reached, when it is suddenly allowed to flow out through the lines. This is accomplished by means of contacts located in the machine case. These contacts are normally of the open or closed circuit type. In the open circuit type, the power generated is not used in any manner until the end of the stroke is reached, when a contact closes, connecting the generator to the lead line terminals. In the closed circuit type, the generator is shorted out through the contacts and a pressure is being built up, causing greater effort to be exerted on the part of the operator as the stroke nears its end, in order to reach the maximum voltage. When the end of the stroke is reached, the normally closed contacts are opened, allowing the current to flow out through the lines. In some machines, a condenser is shunted across these contacts to prevent undue flashes and reduce the arc to a minimum. Regardless of the type of contacts used, the design is always to allow the current generated in the machine a means of flowing out into the lines when the maximum voltage is reached.

Successful operation of these machines is governed to a large extent by the method used in pushing the handle down. A slow easy stroke should never be used but the handle should be shoved down in such a manner that the maximum amount of speed is reached with a quick downward thrust. An operator need not be of the heavyweight class to get the maximum output of a ma-

chine, but he must snap the handle down with all the force and speed possible, using this force for the entire length of the stroke and not "let up" as he nears the end. A good rule to follow is "to try and knock the bottom out of the machine." Another important factor is that the machine should be set as nearly level as possible and not allowed to wobble during the operation. While these points may seem very minor in themselves, tests will show that the output of a machine can be varied over a broad range by even the slightest variation of the stroke.

Testing Methods

The most common method of testing blasting machines, is the use of a rheostat in series with one or more caps. For example, when testing a machine rated for a maximum of 50 caps, the operator simply connects the terminals marked 0 and 50 of the rheostat (or any combination to make 50) in series with one of the lead wires from the machine.



Sketch showing typical test board hook-up for use by the blaster. It will be noted that there are three different taps on this board and the movable lead can be changed to use either, one, two or three lamps depending on the machine that is to be tested. Lamps of the same voltage and wattage must always be used

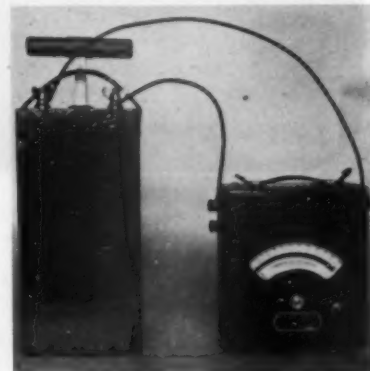
This lead wire connected through the rheostat and the other from the machine terminal are carried a safe distance away where the caps are connected. It is recommended that four caps be used, connected in parallel series and the machine operated in the same manner used in firing a blast. If all the caps fire it has always been considered safe to assume the machine will fire a like number in actual practice. While this method has always been accepted as sufficient proof to determine the reliability of a machine, it is often found that a machine will pass this test and still fall far short of the actual current and voltage it should produce. A test recently made on 20 machines of various sizes and makes, showed that each machine would pass the rheostat test and fire the caps but when actual readings were taken, the voltage varied from a

minimum of 75 to a maximum of 320 volts on the different machines. At the same time, there was a current variation from a minimum of 1.0 to a maximum of 3.0 amperes. The result of these tests will show that while a machine leads the operator to believe it is perfectly all right when it passes the rheostat test which is made under ideal conditions, it might easily be very weak and when taken on the job and connected to long lead wires with many connections made from the caps, there will not be a sufficient amount of electricity generated to fire all the caps and mis-fires will result. It will be of interest to note, that when the machines above referred to were taken apart, cleaned, repaired, adjusted and tested, each and every one generated its full voltage and current ratings.

In the design of blasting machines, certain voltages and amperes are calculated to be generated when the machine is in proper condition. These values will vary, according to the size and make of the machine. They are usually rated as follows: 10-cap size, 100 volts; 30-cap size, 200 volts; 50-cap size, 300 volts (except du Pont); 100-cap size, 300 volts. The current produced by machines of all makes will range from 1.0 amperes to 3.0 amperes depending largely on the voltage produced and the size. For example, the 100-volt machine should not be less than 1.0 ampere; the 50-cap, 300 volt, 1.5 amperes and the 100-cap size should produce a minimum of 3.0 amperes. All these values should be the minimum and any machine should reach them, if it is in proper condition.

From outside appearances no difference can be noticed that will indicate whether a certain 50-cap machine is of the 150 or 300-volt class. Both are identical in case design and size and while they could originally be distinguished by the painted surface, after many years' service

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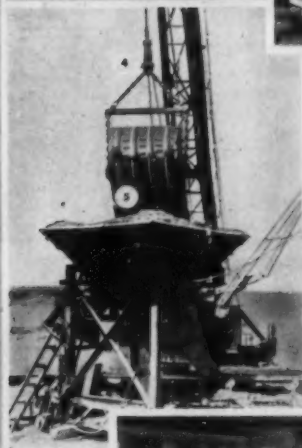


Typical hook-up used in making voltmeter test. Any meter of sufficient range may be used, either a.-c. or d.-c.

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Blast Machine Testing

(Continued from page 86)

and in a number of cases been repainted, the only method of determining the actual voltage it will produce is by testing the machine with meters. This difference could be determined by an experienced electrician who is familiar with coil windings, by taking the machine apart and determining the size wire used in the generator, since the voltage produced is governed by the size wire used and the speed at which the armature is rotated. Unless machines of the different classes are available to make a comparison, it is quite difficult to look at the windings and say what voltage a particular ma-

chine will develop, unless whoever is making the test is familiar with the different designs used in the construction of these machines.

Equipment for Testing

To make the voltage test requires only a few minutes and after this is done there should be no doubt as to what voltage should be produced. One very important factor to be remembered in making this test is that the machine should be in first class condition to start with, since a machine might test at a much lower voltage than that for which it was designed if it is defective in any way but when the trouble is removed and corrected the voltage should come up to its normal rating.

To properly test a blasting machine and determine its exact condition, a very short time is required and a minimum amount of equipment necessary. All that is needed is a voltmeter and a low reading ammeter. Any good make will be suitable but the small portable type found in most plants will serve the purpose best, since these are small and usually very reliable. The voltmeter should have a scale reading of about 0-300 and the ammeter should read 0-5 amperes.

To make the test, simply connect wires from the terminals of the blasting machine to the meter, making each a separate test to determine the voltage and amperes the machine will produce. The first impression one gets in making this test will be the great amount of variations in the readings. Whenever possible, it is recommended that the regular blaster be used as the operator of the machine when these tests are being made in order that he might see these variations, simply brought about by the method used in pushing the handle down. By repeating these tests several times, he can easily determine the best method to use in stroking the machine in order to make it produce its maximum amount of energy. The time spent in this respect alone will be well worth while and it will also show the blaster how easily he can cause a mis-fire by the improper operation of the machine when in actual use.

When a machine is tested and the voltage or current values fall below those given to any extent, the cause should be determined and corrected. One of the most common causes of a poor voltage condition will be found in a machine that is improperly lubricated or in many cases, one that has not been lubricated for a long time. Lack of lubrication will cause a drag as the machine is being stroked and while the operator will not be conscious of the fact and is apparently operating the handle as always, he will actually be lagging on the stroke and instead of generating electricity he will be using his energy to overcome the drag on the parts that are not properly lubricated. The lubrication should never be overdone because the oil can work its way into the windings themselves and this can easily cause additional trouble and possibly the result will be a burned out machine. One or two drops of good machine oil is sufficient for the generator bearings and a few drops on the gears and other moving parts or bearing surfaces is all that is needed. While some manufacturers recommend the use of vaseline on the rack bar and pinion, better results will be attained by the use of a small amount of light grease or oil. The use of vaseline will be found objectionable in warm weather when it will run off when

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Blasting

(Continued from page 88)

subjected to heat and in cold weather it will become gummy and cause the handle to drag. Regardless of the kind of lubricant used never overdo it and instead of waiting for a machine to get rusty and hard to operate, have regular periods designated to oil the machines.

Sometimes brushes will become badly worn or the springs used to hold tension on the brushes will get weak, either of which will cause a burnt commutator on the armature of the generator. This can easily be corrected by installing new brushes or springs and cleaning the commutator with a piece of fine sand-

paper. If the inside of the generator is found to be saturated with oil, it should be thoroughly cleaned and dried out before replacement is made. Very often these machines have been exposed to the weather or stored in a damp place and moisture will collect in the windings. This trouble can often be corrected by placing the machine in a warm oven or any place where a slow drying can be obtained. It is advisable to remove the covers from the case before starting to dry out a machine as this permits the warm air to circulate through the parts more evenly. Usually after a few days drying the machine will be restored to normal voltage, providing there is no other trouble.

When the 50-cap, 300-volt machine was first manufactured, trouble was encountered with the windings breaking down and grounding out to the generator frame or short circuiting within the windings themselves. Some manufacturers changed the design of this machine and reduced the voltage to 150 while others increased the insulation and continued the 300-volt rating. Since many of the original 300-volt machines are still in use and doing exceptionally good work, it is suggested that these machines be tested, and if the voltage is found to be low, steps should be taken immediately to correct the fault because it will only be a matter of time until a complete breakdown occurs and this will cause serious mis-fires. To help prevent a breakdown it is a very easy matter for a competent electrician to open up the generator and insert a piece of thin paper insulation behind the field windings to further insulate them from the frame and also to insert insulation around the end shield where the field coils are very close to the metal. This will do much toward preventing a breakdown at these points which are the most frequent causes of trouble.

At regular intervals the covers should be removed from the case and all parts inspected and cleaned and all connections checked. After this work is completed, all parts should be lubricated and if the machine has tested all right, the covers should be replaced at once. In making this inspection it is of utmost importance to see that the contacts are clean and operating properly. These contacts make or break the circuit every time the machine is operated and very often become burnt, resulting in poor contact. If the points show signs of burning, they should be cleaned with a fine file or sandpaper and properly adjusted. Where the multiple contact device is used, all points should be carefully inspected and the insulating material on both the fingers and contacts checked for burns or other defects that might cause a leakage of current. Sometimes the arm supporting the movable set of segment contacts will get bent and the circuit will be opened or a poor connection will result. In either case the arm should be straightened and adjusted so proper contact is made with the fingers. In some types of machines, a condenser is placed across these contacts and should this condenser become shorted out the contacts will be bridged, preventing the current from flowing out into the lines when the contacts open. This condition can be detected by watching the contacts operate. If no flash or spark is noticed when the contacts operate it is a good indication

(Continued on page 106)

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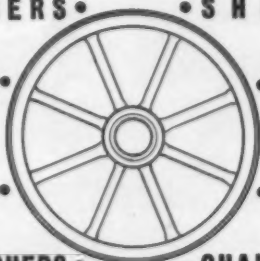
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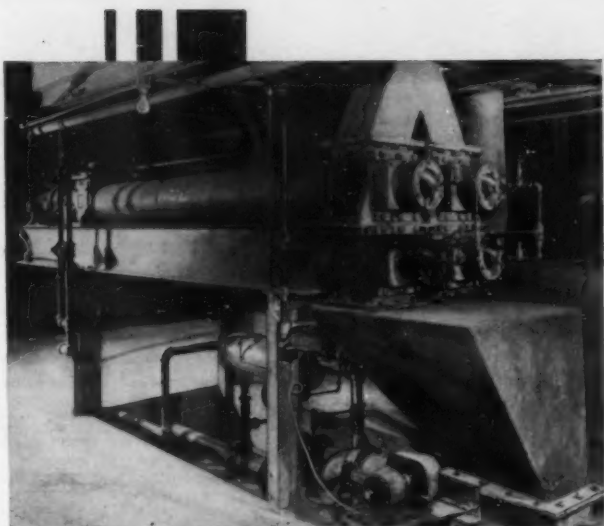


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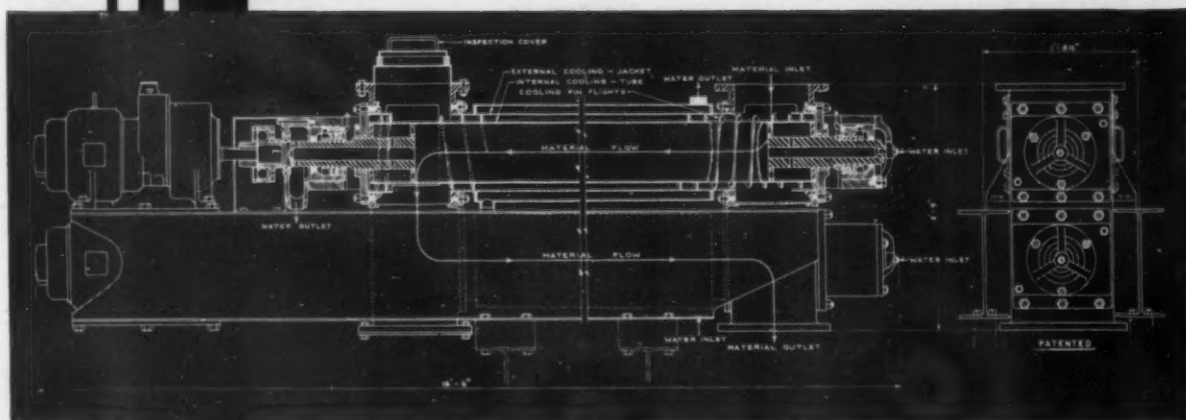
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the tamper has been removed, is available for making special block sizes by hand. The Dunbrik machine operator also handles the Anchor machine.

Automatic Mixing

Spotting the mixer is a comparatively easy job as it is only necessary to press a button on the electric control board and the mixer stops in the exact desired location above the block machine. It is also dumped automatically into the right chute over the hopper of the block or brick machine requiring concrete. This automatic mixer system has a specially designed eight-stage control. There are three electric motors, one for propelling, one for mixing, and one for dumping.

Loaded racks are moved from skids by means of three Barrett lift trucks into six steam curing rooms of sufficient capacity so that no matter what the demand, all block or brick are thoroughly cured before removal to the outside storage yards. A Fitzgibbon boiler, supplied fuel by an Iron Fireman stoker, furnishes steam vapor to the curing rooms, the walls of which are made of concrete block with canvas enclosures at the ends of each room. Canvas enclosures are

rolled down from the top and securely fastened at the sides, and a draw rope is used to pull up or lower the canvas just like a shade. Curing rooms are located directly across from the block machines and extend out at right angles from the main plant so that a minimum time is taken in handling block from machine to curing room.

Large Storage Area

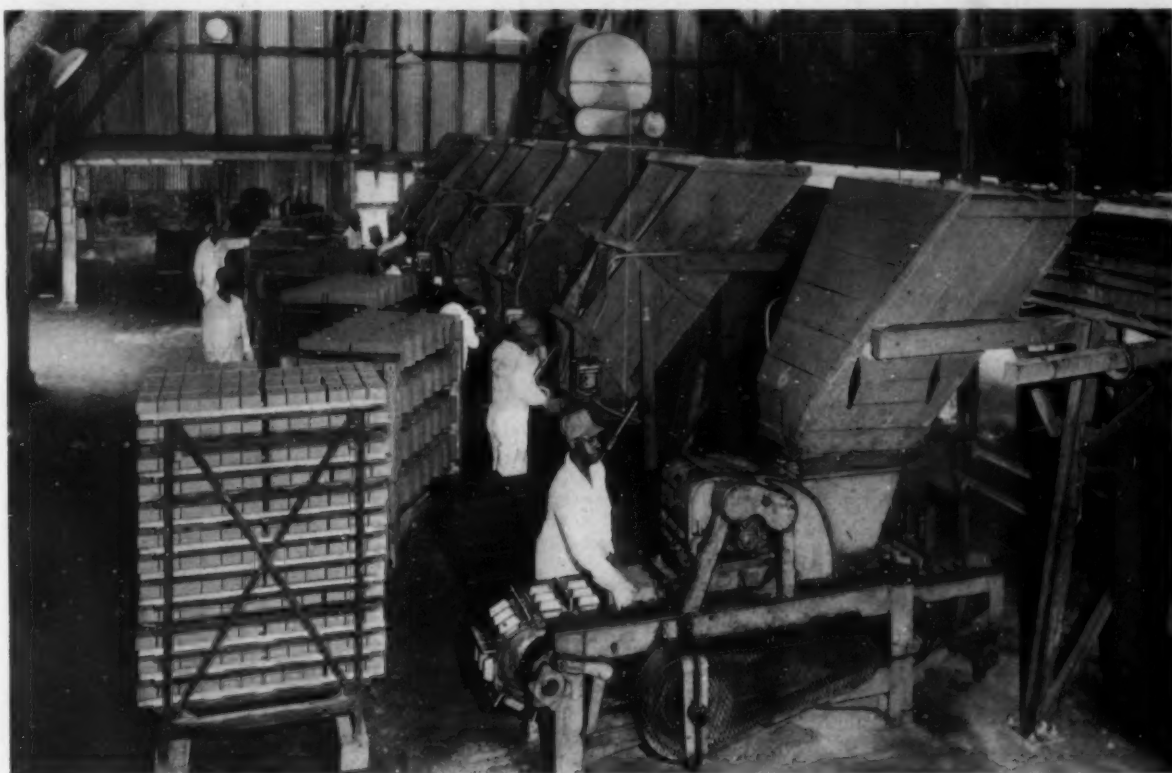
Ample outside storage area is available to permit thorough air curing before the block or brick are hauled to the job. Wide aisles between stockpiles are paved to permit easy hauling of block from the curing rooms and for trucks to load up for final delivery. Eight trucks are used to make deliveries; three Chevrolets and one Ford are semi-trailer units and the others are one Diamond T, two Chevrolet, and one Mack truck.

The plant has a production of about 5000 block daily, varying with size of block and speed of operators. Some of the best operators make 1200 8- x 8- x 16-in. units daily.

In addition to concrete products, the Tampa Sand & Material Co. supplies ready mixed concrete and dry batched aggregates. Back of these

(Continued on page 99)

CONCRETE MASONRY



Battery of five vibrating concrete block machines and one concrete brick machine in foreground. Automatic, electrically-controlled mixer on track above is spotted and dumped by merely manipulating a push-button



Directly opposite battery of block machines are the steam curing rooms, convenient for handling loaded racks by lift truck

Concrete Pipe

Make Long Pier Caissons from Concrete Pipe

Ballentyne Pier, Vancouver, B. C., constructed with concrete pipe caissons and precast piles and beams

By M. W. LOVING*

INSTALLATION of reinforced concrete pipe lines under railroads, highways and busy streets by what is known as the jacking method has been common practice for more than 20 years. Pipe lines ranging in diameter from 30 to 96 in. have been so placed, utilizing jacks with capacities up to 700 tons which pushed the reinforced concrete pipe lines through fills. Conversely, few engineers and contractors are familiar with the outstanding advantages of reinforced concrete pipe caissons, the placement of which might properly be termed vertical jacking, except that the weight of the units is usually adequate to sink the structures without resorting to weighting devices. This is particularly true when a properly designed cutting edge is fitted to the lead pipe.

Ballentyne Pier, Vancouver, B. C., Canada, is one of the early improvements where reinforced concrete pipe caissons were used on a large scale. The pier is about 1200 ft. in length and 360 ft. in width and was constructed in 1920-21 under the supervision of the Vancouver Harbour

Commission. The total cost was approximately \$4,400,000. The consulting engineer, Mr. Swan of Montreal, P. Q., Canada, is said to have been responsible for this type of construction, based on experience in Halifax, N. S., Canada, England and South Africa.

The caissons, shown in one of the illustrations, were constructed with precast reinforced concrete pipe 66 in. internal diameter, shell thickness 9 in., and most of the units were 16 ft. 8½ in. in length, others 11 ft. and many ranging from that to 2 ft.—used for adjustments.

All reinforced concrete structures located below 10 ft. above high tide were fabricated as precast units, including bearing piles, sheet piles, trusses, bearing beams, fender beams, etc.

The cost of all precast concrete structures is said to have been approximately \$2,000,000 of the \$4,400,000 total cost previously mentioned. At this point it may be well to emphasize that this extensive use of precast units was to assure a long life expectancy for the reinforced structures exposed to sea water. The



Steel drill rods (four to each pipe) were used to provide smooth internal and external surfaces on the large reinforced concrete pipe for Colorado River Aqueduct, Los Angeles, Calif., in 1936

reinforced concrete pipe caissons were made with a very rich mix of concrete—1 part cement, 1½ of fine and 2 parts of coarse aggregate and, very important, the concrete units were cured for 60 days and during the first three weeks all precast units were not allowed to become surface dry, thus every precaution was taken to assure the use of dense and impermeable concrete. The minimum cover of concrete over all steel reinforcement was 3 in. and inspectors were on hand to see that this requirement was complied with.

W. E. Corbett, concrete pipe manufacturer of Milford, Mass., kindly furnished many of the details on which this article is based, as he was sent to Vancouver in 1920 for four months to instruct officials of the Northern Construction Co., the contractor, on the proper methods of fabricating and handling large precast units. He also furnished several of the views and drawings appear in the article.

How Pipe Caissons Were Made

The reinforced concrete pipe caissons were placed approximately on 16 ft. centers longitudinally of the pier and 24 ft. centers across and were sunk to depths ranging from 60 to 100 ft. to rock. As shown in the accompanying sketches, the reinforced concrete pipe caisson units were tied together with twelve 1½-in. rods upset to 1¼ in. at each end and threaded for 1¼-in. nuts. A socket



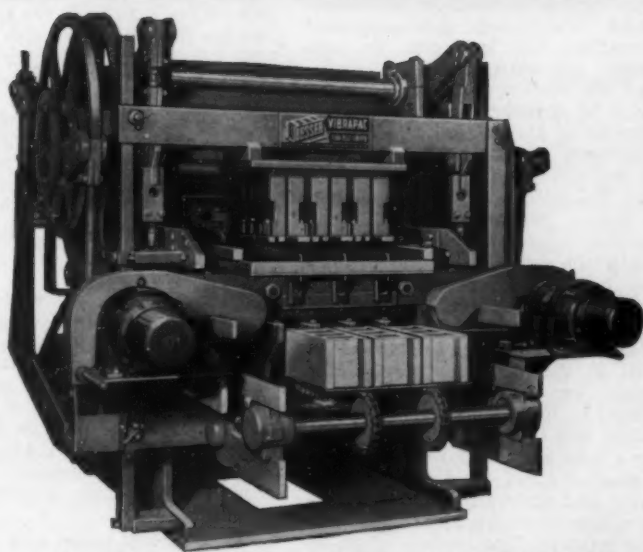
Casting yard in North Vancouver, B. C., where precast reinforced concrete units valued at more than \$2,000,000 were fabricated for Ballentyne Pier

Concrete Masonry Units For Pride of Ownership



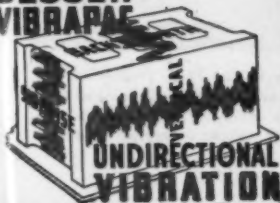
To homes of the more substantial character, Concrete Masonry lends an atmosphere of distinction and charm. These larger Concrete Masonry homes are adaptable to landscape designs not to be obtained with less plastic materials. The artistic Concrete Masonry home completes an estate picture.

BESSER Vibrapac BETTER Concrete Masonry units in the hands of skilled architects and builders have become in effect a new building material.



Besser Super Automatic Plain Pallet Vibrapac. Capacity 600 8"x8"x16" per hour made 3 at a time on one plain pallet. Smaller units made in larger multiples on the same pallets.

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The Vibrapac combines vibration with exclusive patented Besser Plain Pallet principle.

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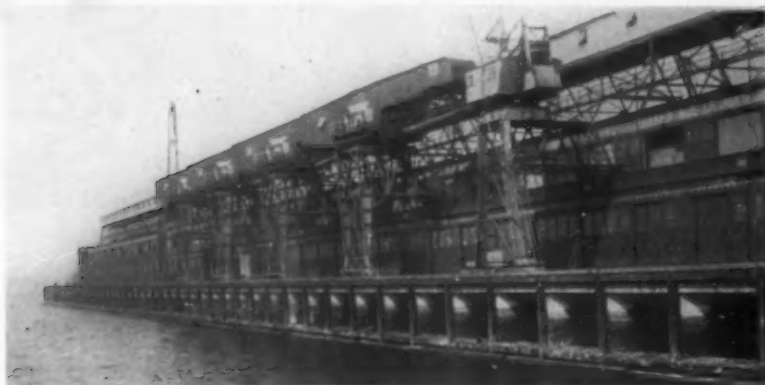
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Products Plants

THE SAVING IN PALLET COST WILL PAY FOR
A BESSER VIBRAPAC PLAIN PALLET STRIPPER

CONCRETE PIPE



Ballentyne Pier, Vancouver, B. C., showing one line of 66-in. reinforced concrete pipe caissons

was cast in the top and bottom of each pipe so that connector clips and nuts could be placed after the pipe was set in the ways. These rods extended completely through the pipe wall longitudinally. Grooves were cast in the pipe shoulder outside of the spigot circle which were originally intended to be filled with a plastic bituminous compound so that the bell of the next pipe rested on it while the compound was still plastic. It is said it was found later that a small rubber tube placed between each section formed a watertight gasket, which was generally used thereafter. The lead pipe in each caisson was fitted with a cutting edge, the exterior diameter of which was 6 in. greater than the exterior diameter of the caisson.

The pipe were loaded on barges at the North Vancouver manufacturing yard, floated to the pier site, placed in special pile leads by a derrick boat and sunk to rock by excavating within the caisson with an orange peel bucket whose open diameter was slightly less than the 66-in. inside diameter of the pipe. When resistance was sufficient to stop settlement in the vertical structure, the caisson was pumped dry, the hole cleaned by hand labor, and adequate cutting was made in the rock to insure a solid bearing. A seal consisting of about 4 ft. of 1:2:4 concrete was placed and the balance of the caisson was filled with a foundation concrete mixture. Two sections of 80-lb. rails were embedded upright in the top of the caisson and left about 6 ft. higher than the top of the upper pipe. Provision had been made in the fender beams to allow these rails to pass vertically through and project into the 11-ft. long pipe which supported the floor assembly of the pier. The tops and bottoms of the ends of these fender beams were formed to fit pipe spigots and bells so the beam location was fixed. When this 11-ft. pipe section was filled with concrete, bond to these rails tied the entire structure into a monolith.

Use Precast Piles and Beams

The first operation at the pier site was the excavation of the basin surrounding the pier and placing the excavated material into what was later to be the longitudinal center of the pier. Precast reinforced concrete bearing piles, ranging from 34 to 100 ft. long, were driven in groups and precast bearing beams were placed between pile clusters. Against this bearing beam was driven a line of reinforced concrete tongue and groove sheet piles, each about 34 ft. in length, to hold back the edge of the center fill. Outside of this sheet piling were the reinforced concrete caissons which, as previously stated, varied in depth from 60 to 100 ft. These caissons were sunk partly through the toe of the filled embankment and rose to nearly 60 ft. above the bottom of the bay. The longer caissons weighed about 19 tons, the trusses about 31 tons, fender beams 15 tons, and sheet piles about 1½ tons.

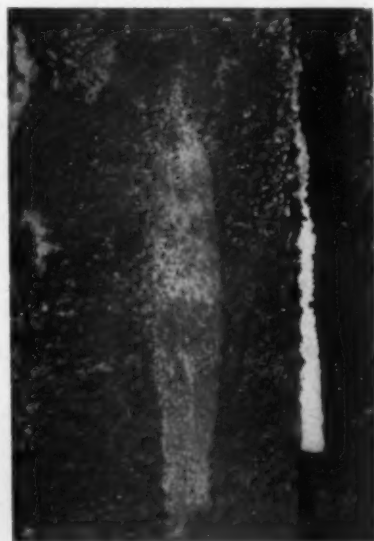
In April, 1944, the writer was informed that the precast units under the Ballentyne Pier were carefully examined by divers in 1942 and the concrete was found to be in excellent condition after 22 years of service. It is said that the officials are highly pleased with the outstanding performance of the precast reinforced concrete structures previously mentioned.

Mr. Corbett also said that the Management and Engineering Corporation of Chicago used reinforced concrete pipe caissons for the foundation of the Raritan River plant of the New Jersey Electric Power and Light Company at Sayreville, New Jersey, in 1929 and 1930. Approximately 1010 ft. of 48 in., 3332 ft. of 54 in., and 3890 ft. of 66 in. reinforced concrete pipe were required in 1929. These pipe were 4 ft. in length. In 1930, 1868 ft. of 48-in. pipe, 8 ft. in length, were used for the construction of these caissons. The average depth was 50 ft. and 101 caissons

were completed in 107 working days. They were sunk in swampy soil consisting of about 10 ft. of meadow grass, 25 ft. of soft mud, 10 ft. of shale, more mud and pebbles, and then to rock. The total cost of this work was approximately \$178,000. Pipe were tied together with cables and no cutting edge was employed. Some of the caissons were sunk with 40-ton weights of pig iron. No pile ways were found necessary in the latter part of this project.

In commenting on the manufacture of the reinforced concrete caisson pipe at Vancouver in 1920, Mr. Corbett said: "The pipe were spaded and the outer casing was vibrated by men using small air hammers and fiber faced tools. Any air bubbles or blemishes ¼ in. or more had to be filled by the use of a cement gun. Our vibration of the outside casing was one of the early uses of this method of placing concrete to get a smooth finish."

In fabricating the large reinforced concrete pressure pipe for the Colorado River Aqueduct in 1936, the manufacturers of the pipe employed steel drill rods rotated at about 900 r.p.m. by motors which were operated by compressed air, as shown in the accompanying illustration. The drill rods were about 14 ft. in length and were provided with a slight offset at the lower end to aid in propelling the rod through the concrete adjacent to the inner and outer forms. The pipe ranged in diameter from 10 ft. 3 in. to 12 ft. 6 in. and were 12 ft. in length. The shell thickness of the pipe ranged from 11 to 13 in. and the circumferential steel reinforcement from 1.8 to 2.8 sq. in. per ft. of pipe.



Close-up of one of the 66-in. reinforced concrete pipe caissons supporting Ballentyne Pier. When barnacles were scraped off, the concrete was found to be in perfect condition

CONCRETE PIPE

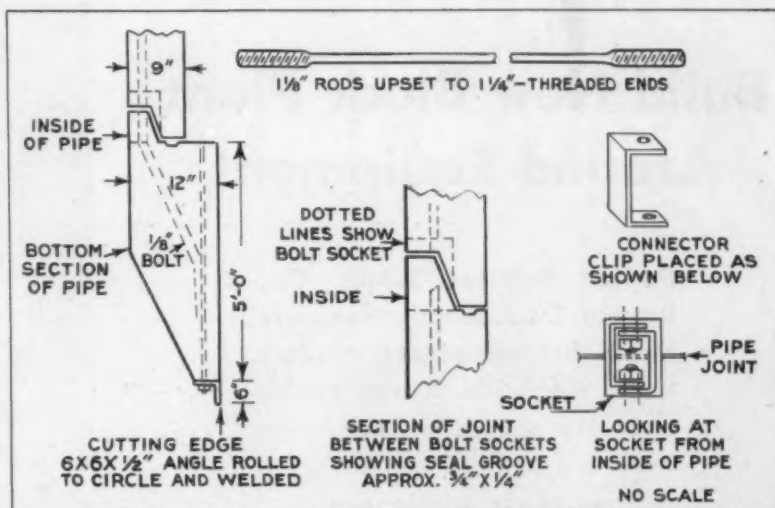
The engineers of the Metropolitan Water District of Southern California required a perfect finish on the interior and external surfaces of the pipe—free of air bubbles and voids of any kind. These drill rods—four used on each pipe after the concrete was placed—provided an excellent finish and they worked the concrete in and around the heavy steel reinforcement, assuring a perfect bond of the concrete to the steel. The concrete was very dense and impermeable.

The same system was employed in manufacturing 60-in. reinforced concrete pipe from 12 to 18 ft. in length which were used for the subaqueous pipe line installed by the County Sanitation District of Los Angeles County in 1936. Approximately one mile of this pipe was required and was installed at depths ranging from 10 to 110 ft. below mean tide in the Pacific Ocean off San Pedro. The pipe were very heavily reinforced with steel and a perfect finish was obtained on the interior and external surfaces of the pipe by the use of the drill rods previously mentioned.

So much has been said and written about the durability of concrete when exposed to sea water, it will be of interest to the reader to know that in 1924 the City of Los Angeles placed in service an 84-in. submerged sewer, 5300 ft. in length, built with reinforced concrete pipe with a shell thickness of 9 in. and 12 ft. in length, made with 1:1½:2½ concrete mixture. The pipe were reinforced with two circular steel cages placed approximately 2 in. from the inner and outer surfaces of the pipe. In 1936 five joints of the pipe were raised onto a scow, cleaned and thoroughly examined by the engineers of the City of Los Angeles. The concrete and the steel reinforcement were found to be in perfect condition after 12 years of service.

Mid-West Concrete Pipe Company Tests Caisson

In 1930 a reinforced concrete pipe caisson was sunk to a depth of 65 ft. at Franklin Park, Ill., by the Mid-West Concrete Pipe Company to demonstrate its advantages to local engineers and contractors. The 13 caisson pipe, fitted with special tongue and groove joints, were 60 in. in diameter, 5 ft. in length, with a shell thickness of 6 in. Two cages of welded wire steel mesh totaling 0.29 sq. in. per ft. were placed 1 in. from the inner and outer surfaces of the pipe. Four 1-in. metal pipe, 5 ft. in length, were securely anchored in the center of the pipe shell—longitudinally at each quarter point. The unit was then cast with a concrete mixture to provide a compressive strength of about 4000 p.s.i. when the units were carefully cured for more than two weeks.



To the left: Details of cutting edge for concrete pipe caisson. Center: Section of pipe joint. Above: Rod which ties caisson together. Right: Pipe joint and connector clip details

The lead pipe were provided with a steel cutting edge whose external diameter was 2 in. greater than the external diameter of the reinforced concrete pipe caisson. The cutting edge was fastened to the first pipe with four ¾-in. steel rods which were placed through the four 1-in. metal pipe previously mentioned and secured tightly to the cutting edge. Sleeve nuts seated on 2-in. diameter and ¼-in. thick metal washers were threaded to the four steel rods at the top of the first pipe. Recesses were cast in the pipe shell to receive the sleeve nuts. The second pipe was placed after the joint of the first pipe was plastered with portland cement mortar; then four more ¾-in. steel rods were threaded into the sleeve nuts previously mentioned and the pipe drawn tightly together. In this way the units were securely held together and the joints did not leak during the operation of sinking the caisson or thereafter.

For the first 15 ft. excavation within the pipe was made with an orange peel bucket, but when hard clay was encountered it was loosened with air spades until sand, gravel and other soft strata were encountered. Several water veins were sealed as the caisson progressed downward, but there were no leaks at the joints. Sinking of the caisson was not continuous and when work was resumed after a day or more, excavation progressed two or more feet below the cutting edge before the caisson settled. Workmen were not subject to hazard during the whole operation. No weighting device was required to sink the caisson, although provision had been made to weight the structure if it froze. The greater diameter of the cutting edge, of course, minimized resistance to downward progress of the caisson.

Five Block Machines

(Continued from page 94)

enterprises are some very active company officials, J. L. Cone, president; V. G. Cone, vice-president; T. E. Dressler, secretary-treasurer; and Fred H. Poe, general superintendent. Frank Brice is superintendent of the concrete products plant.

Labor Attitude Toward Concrete Masonry

DISCRIMINATION against concrete block on the part of some local bricklayer unions in certain areas has been given thoughtful consideration by the National Concrete Masonry Association. This has been particularly serious in the New York Metropolitan area. However, the association presented a statement of reasons why the bricklayers' best interests would not be served if the concrete masonry units are arbitrarily restricted, and a more reasonable attitude has now been taken by the unions in this area. It was pointed out, among other reasons, that the bricklayers would be destroying their own labor market if they imposed impossible economic conditions for the use of concrete block. In contrast to the New York attitude toward concrete block, the Detroit bricklayer union works in complete harmony with contractors using concrete block.

Add Block Machine

BELT CONCRETE BLOCK CO., Tiltonville, Ohio, has placed in operation a Besser Vibrapac block machine, according to Jos. R. Belot, owner. Mr. Belot states that about 83 percent of all the concrete block manufactured are going into the coal mines for brattice work.

Curing

Build New Block Plant Around Equipment

Dayton Builders Supply Co., Dayton, Ohio, supplies concrete block for structures at two large air fields. Large curing capacity speeds up deliveries

By JAMES A. TWYMAN

FACING forfeiture of a large government contract due to the inability of another company to supply block on time, the Dayton Builders Supply Co., Dayton, Ohio, decided to go into the business.

In the early days of the expansion at Wright Field, the Dayton company entered into a contract with a government contractor to supply, in quantity, a number of items, one of which happened to be concrete block. Therefore an arrangement was made with a block manufacturer 75 miles away to make the block. The deal was closed, delivery dates set, and the company made bond to assure faithful performance of the contract. It soon became time to deliver some block. It was then discovered that the company which was to make the block lacked either the capital or the imagination to handle a large order. After weeks of delay in trying to work out the problem, officials of the Dayton company facing a forfeit, decided that they had better get busy.

They promptly went out and bought a five-acre field along the railroad

Vibrating type block machine turns out block on a production basis

tracks to have a place for the Besser Vibrapac when it would arrive. The day after the block machine was set up operations began even though the plant substructure had not been completed. Blocks were made, wetted down each night, and later yarded around the grounds. A building to house the equipment along with the curing rooms was soon after completed with few interruptions to production.

The man who had contracted to erect the building and kilns, P. C. Merrill, didn't know any more about block manufacturing than did the officials of the company, so they decided to see what other people were doing. Some of the ideas they saw appealed to them, some of the others did not. Some ideas, while they worked, seemed cumbersome to their way of thinking. The result is that

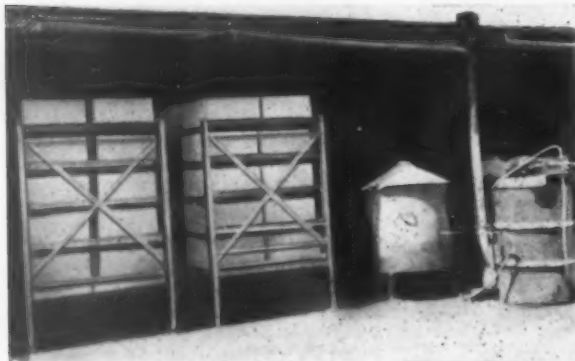
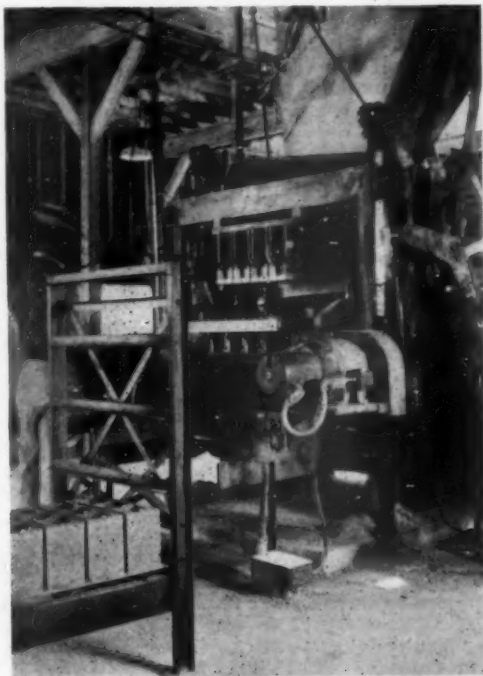
they have constructed a plant, complete with curing rooms, paved yards, and new equipment, that has brought other block manufacturers to Dayton on inspection trips. Mr. Merrill, who came into the picture as a building contractor, stayed on as plant superintendent and is enthusiastically working on a salary for the first time in his life.

Curing Methods

Designed for in-line production, the block are made in a Besser Vibrapac and are moved to curing rooms in Chase racks. One hundred Chase racks, five tiers high and two tiers wide, each holding 60 block, are in use. A Stewart-Warner hand-operated lift truck moves the racks into one of three curing rooms just to the left of the block machine.

Curing rooms are 80 ft. long, 12

(Continued on page 102)



Left: Close-up of curing rooms showing canvas drop curtain and oil-fuel fired heater and pump. Right: Gasolac-driven lift truck moves block from machine to three curing rooms which provide ample capacity

NO

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WHAT SAVINGS
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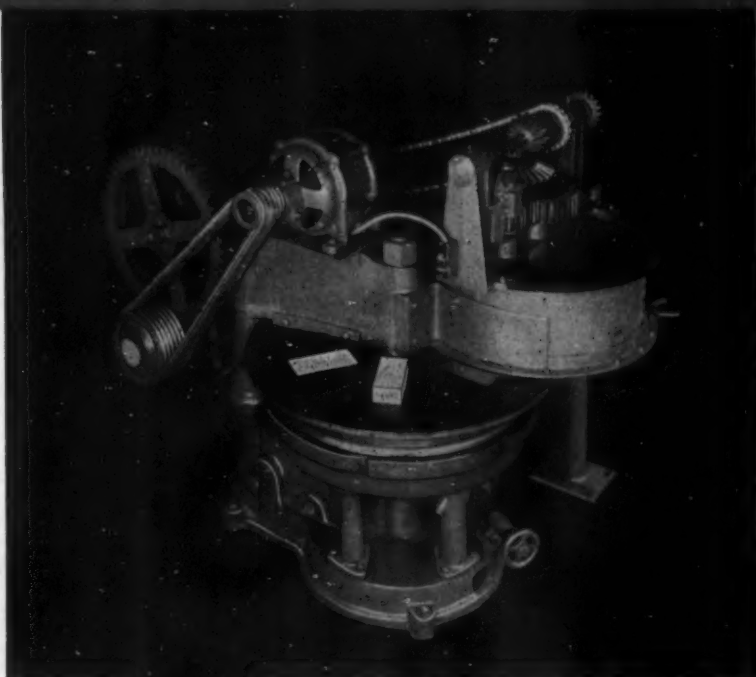
**28,000
PERFECT BRICK
IN ONE 8-HOUR
SHIFT . . . and
NO PALLETS
NEEDED**

Smart operators find Jackson & Church units to be highly profitable installations because the machines operate as any other well-designed, smoothly-functioning machine does which turns out a "quality product" on a mass production basis. Type A machine produces up to 28,000 perfect bricks in one eight-hour day and Type C, shown here, turns out up to 14,000 per day.

Bricks made on these units find ready sale because of their even texture, square corners, uniformity, and all-around quality. In addition J & C machines eliminate the need for costly pallets and save considerable labor. The concrete is compressed so firmly that the bricks are removed by hand and piled on top of each other in flat-deck platforms. Either frog-type or solid concrete bricks can be produced.

BE PREPARED for the post-war reconstruction period with Jackson & Church brick machines and plant equipment. Write for complete information and prices to . . .

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PERFECT BRICK

Pressed in a pocket under 10,000 psi. pressure, each brick is square, true to size and free from warp. Up to 320 bricks can be made from a single sack of cement with strengths as high as 3,700 psi. and absorption as low as 6%. J & C machines produce plain or colored bricks from standard or special lightweight aggregates.

**JACKSON AND CHURCH COMPLETE
BRICK-MAKING PLANTS**

CONCRETE PRODUCTS MACHINERY

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Continuous and Batch

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Vibra-Press and Strippers

ELEVATING EQUIPMENT

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TRANSMISSION MACHINERY

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Complete
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Equipment for all phases of manufacturing concrete cinder block and other lightweight aggregate units. Our engineering service for new plants and modernizing old ones will help you operate more economically.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns Jolcrete, Stearns mixers, pallets, Straublox Oscillating attachments, etc.

Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

Anchor Concrete Mchy. Co.

1191 Fairview Ave., Columbus 8, Ohio

Curing

(Continued from page 100)

ft. wide, and 6½ ft. high. Quite naturally the side walls and partitions are of concrete block construction. They have concrete floors, are well lighted, and the structure is roofed with Flexicore slabs covered by a three-ply tar and gravel roofing paper. Each curing room will hold 43 filled racks. When the curing rooms are charged, a wooden, counter-weighted lift door is lowered. Overnight curing begins when the outside canvas curtains are lowered and the oil-fired Aerol salamander is lighted. A motor-driven fuel oil pump placed on top of a fuel oil drum supplies two rooms, a salamander in each. Two metal screens are placed in each room to protect the block nearest the salamander. After four or five hours the night watchman cuts off the salamanders. A temperature of 120 deg. F. is maintained with practically no loss of moisture.

Lighted candle tests also have been made, and it has been demonstrated that a uniform over and under circulation of air is in progress all during the curing period. It is a natural process that is probably caused by the colder air coming in through the narrow opening under the outside canvas curtain. The warm air passes along the ceiling, hits the wooden inside door, and down to the floor, then back to the canvas curtain up and on around again. This feature has been of interest to plant visitors.

A Baker-Rawlings gasoline motor driven platform lift truck removes the racks to the yard. Block are stacked according to sizes in a manner that makes it possible for a truck to load from either side of the pile. The truck can always pass down an aisle taking the older block first, while the racks from the kiln are being unloaded on the other side. Plenty of paved yard space has been provided to permit the yarding of a variety of sizes.

Since the plant has been in operation, more than a million block have been supplied to Wright and Patterson Fields. While the bulk of the block were furnished by Dayton Builders Supply Co., some were made under subcontract with other producers. Everything possible has been done to maintain peak production. The plant was built near a railroad siding with paved space between the building and the track. Sand and aggregate are unloaded from the cars to this pavement. A battery of rubber tired wheel barrows, filled first with sand and then two sizes of aggregate are wheeled directly into the building and dumped into the floor-level 2-cu. yd. Besser paddle mixer. These wheelbarrows will soon be supplanted by a Butler car scoop. Since a lightweight aggregate is specified on the government orders, coarse and fine

Celocrete is being used. The mixture calls for three barrows of coarse Celocrete, then water, followed by eight barrows of fine Celocrete and five sacks of cement. Sacked cement is stacked within handy reach of the mixer. A skip lifts the batch to the block machine.

A Kirk and Blum vibrator, 20 ft. long and 3 ft. wide, operated by a 1-hp. motor is used for making lintels. When the need arises it can be used for joists and other specialties.

Right now the plant is given over to government work requiring few block sizes, but the Dayton Builders Supply Co. is equipped to turn out a long list of items. Block can be made 4- x 8- x 16-in., 4- x 8- x 12-in., 6- x 8- x 16-in., 12- x 8- x 16-in., and 8- x 8- x 8-in. Corner block can be made for all these sizes. It is also possible to make 8- x 8- x 16-in. and 12- x 8- x 16-in. sash block with single and double bullnosed corners. In Celocrete and sand and gravel concrete this will provide a good general line of merchandise to meet most construction needs.

Test Farm Market

However there is a substantial secondary market at hand. A modified test was made by using a 2-in. x 2-column advertisement in the Dayton newspapers and merely announcing that block were available in limited quantities for farm use. The ad appeared but once but enough farmers came over from the nearby stockyards to provide a comfortable feeling that when the time came to look for markets that there would be a substantial outlet waiting in farmers' return loads.

The Dayton Builders Supply Co. has been in business for many years. The officers are Gail B. Hamer, president; B. A. Wettig, vice-president; P. Barton Meyers, secretary; and Sam C. Davis, treasurer. The company is listed in the city directory as dealers in coal, lime, cement, sewer pipe, flue linings, fire brick, plaster, carbides, reinforcing steel, and metal lath. The next edition will probably place "manufacturer of concrete block" ahead of the other items because the company is now the largest block producer in the area.

Build 550,000 Homes

APPROXIMATELY 550,000 new privately financed dwelling units have been started in war industry areas since the start of the national emergency in July, 1940. These homes have been built under the program of the Federal Housing Administration, with insured financing of more than \$2,275,000,000, according to Commissioner Abner H. Ferguson.

Buy Vault Concern

J. F. RUSTIN has purchased the Chipley Vault Co. from J. T. Sapp. Mr. Rustin will operate under the name of The J. F. Rustin Vault Co., Chipley, Fla.

ADD a Concrete Pipe Plant the UNIVERSAL WAY

Let Us Equip You Now to Produce All Sizes Profitably

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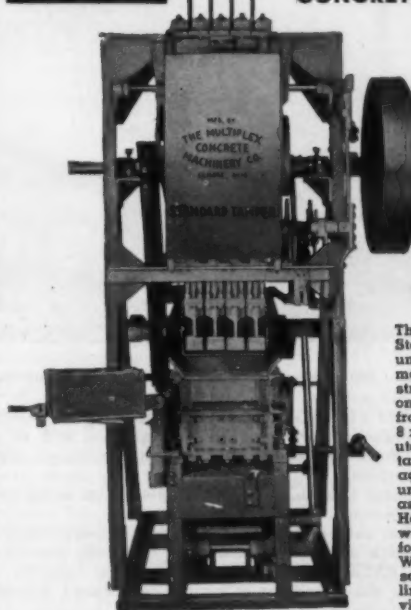
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MORE
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MULTIPLEX CONCRETE MACHINERY



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601 TIMES BLDG.

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**Capacity 250-350 Cu. Yd.
Per Hour . . . Available
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Complete Butler concrete plant. Excellent condition, used only 7 months. Adaptable for either commercial or construction use where high rate of concrete pour may be required. Equipped for manual, semi-automatic or automatic operational control. See details below.



BATCHING BIN. Bin—250 yd. capacity—190 yd. 3-compartment aggregate 400 bbl. cement.
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BATCHERS. 1 Butler aggregate 5 yd. capacity, complete with beam-type scale, manual operation.
 1 Butler cement 3,000 lb. capacity, complete with beam-type scale, manual or automatic operation.
 1 Butler water batcher 200 gals. capacity, beam-type scale, complete with 400 gal. surge tank and valves, manual or automatic operation.
ELEVATOR & TRACK SCREW. 300 bbl. per hour capacity, screw 37 ft. long, equipped for either box car or hopper car cement delivery. Complete with 20 hp. electric motor.
CONVEYORS. 1 Barber Greene 36" inclined conveyor 224' 6" long, equipped with: 50 hp. Century motor; one 40 yd. track hopper; one 20 yd. track hopper; one 20 yd. truck hopper. All necessary A frames, trusses and supports included. All hoppers equipped with discharge gates.
 1 Barber Greene 36" horizontal conveyor 129' 6" long. Complete with 18 double clam-type fill valves, 20 hp. Century electric motor complete with trusses.
 1 Barber Greene 36" inclined conveyor 60' 6" long. Complete with 15 hp. electric motor, trusses and supporters.
 All conveyors in excellent condition; two-way Alemite system of lubrication; band-type brake; pivoted distributor, ground level controlled. Conveyors operated under cover while in use. Idler take-up and return idler rollers in good shape. Extra length new 500 ft. belt available.

MISCELLANEOUS. Collecting hopper under batcher, 5 feet cement screw feeder complete with motor for automatic control of cement. Traveling hopper for charging batch trucks. Extra cement buckets, drive chain, elevator chain for cement elevator and track screw, etc.

Also 28 Late Model Transit Mixers

- 11—1942 Model Jaegers — High discharge, separate engine drive with two-speed transmission. 7 mounted on 1942 Dodge six wheelers, good rubber, excellent condition.
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INFORMATION

TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

You can obtain catalogs listed on these pages by merely checking and mailing the coupon below.

1 ARIDIFIERS—Logan Engineering Co., new bulletin 543-A describes and illustrates how the aridifier purges air and gas lines of moisture, oil, dirt, rust and fine scale. The bulletin contains new tables and data on the discharge of compressed air from 1/64- to 6-in. openings with line pressures ranging from 10- to 125-lb. per sq. in. Two pages of charts are shown.

2 BOILERS—Geo. P. Reintjes Co. new bulletin No. 431 describes and illustrates sectionally-supported upper side walls for bent-tube boilers as a remedy for excessive air leakage.

3 CAR SPOTTER—Link-Belt Co. has issued a 16-page book (No. 1992) describing and illustrating self-contained electric car spotters for pulling piles of lumber into and out of kilns; moving kler cars in textile mill; warping vessels along docks; launching and beaching flying boats; serving car-hearth furnaces; and dragging heavy loads along ground. Horizontal-drum type car pullers for heavy duty service, and special capstans and anchor windlasses for marine service, are also shown.

4 CLARIFIERS—W. G. B. Oil Clarifier, Inc., has issued a bulletin describing and illustrating C-100, S-100, J-100, T-100 clarifiers for gasoline motors and TF-100, JF-100 clarifiers for Diesel engines.

5 CIRCUIT BREAKERS—I-T-E Circuit Breaker Co., has published a 32-page catalog No. 1002 covering the selection and construction of low-voltage air circuit breakers. Schematic diagrams, descriptions and illustrations of protective devices, tables giving carrying capacities of wire and cable, and approximate full-load currents drawn by d-c. and a-c. motors from 1/4 to 1000 hp. are also included.

6 COMPRESSORS—American Brake Shoe Co., Kellogg Division, has brought out a bulletin describing and illustrating various types of compressors. A section of the bulletin is devoted to air operated tools, switches and tanks, parts and accessories. Cost tables, specifications and instructions for maintenance are also included.

7 CONTROLS—B/W Controller Corp. new 28-page catalog No. 943 describes and illustrates all-electric floatless liquid level controls, which are effective to within 1/4-in. variations in any fluid that is an electrical conductor. Information on special controls and panels, a-c. automatic starter and relay combinations, selector switches, special relays, water-proof enclosures, wiring diagrams, etc. is also included.

8 CONTROLS—Wheelco Instruments Co. has issued an 8-page bulletin A2-3, describing its line of potentiometers. The bulletin describes the potentiometer method of heat measurement. Also included is a list of instrument features, four operating diagrams, and a table of potentiometer scale ranges obtainable with various thermocouples and a photoelectric pickup unit.

9 CRUSHERS—Pioneer Engineering Works has released a new catalog illustrating and describing jaw crushers, how they operate, how they are built and how to select the right crusher. Capacity figures, materials used and table of sizes, specifications and data are also included.

10 HARD-SURFACING—Stulz-Sickles Co. has issued a bulletin describing and illustrating the properties of Manganal as a welding electrode. The bulletin also lists industries and parts serviced with Manganal and methods used in repairing and reclaiming crusher plates, tractor grouser cleats, bucket and shovel teeth, etc.

11 METERS—The Foxboro Co. has released a 232-page handbook, entitled "Principles and Practice" of flow meter engineering. It is illustrated with photographs, diagrams and curves, and contains tables and formulae for any ordinary liquid or gas flow computation.

12 MOTORS—Electric Machinery Mfg. Co. has issued a 4-page folder, No. 173, describing and illustrating motor construction and engineering design. Motors are available with minimum ratings of approximately 300-hp., speed 500 r.p.m., and higher, and are of the coupled, pedestal-bearing type. Synchronous motor control is also discussed.

13 NOZZLES—Spraying Systems Co. has issued a new 32-page catalog No. 22 describing and illustrating spray nozzles and related equipment, detailing spray characteristics, dimensions and performance data. Nozzles are fully illustrated. Catalog includes specifications and tables of useful engineering data, also descriptions of humidifying assemblies, roof spraying systems, and cooling tower and spray pond assemblies.

14 PALLETS—The Commercial Shearing & Stamping Co. has released a new cata-

log describing and illustrating block and tile pallets. Dimensions and code words for pallets with and without mortar grooves are also given.

15 PULVERIZERS—Eagle Crusher Co., Inc., has issued a bulletin describing and illustrating impact breakers and pulverizers in a single unit for use by quarrymen, cement manufacturers, cinder block concerns, farmers, etc.

16 SYNTHETIC RUBBER—United States Rubber Co., new booklet, "The Five Commercial Types of Synthetic Rubber," traces the development of synthetic rubber and describes the properties of the five commercial types. Photographs of synthetic rubber manufacture, many diagrams, and a chart giving relative physical and chemical properties of natural rubber and of Buna-S, Buna-N, Neoprene, Butyl and Thiokol are included.

17 SHIMBLES—Garlinghouse Bros. has issued bulletin No. 72 describing and illustrating regular and heavy pattern shimbles. A shimble is a wire rope fitting that is both a shackle and a thimble.

18 SUBSTATIONS—Allis-Chalmers Mfg. Co., new bulletin B-6285, entitled "Packaging Pays Off" describes standardized load, center-unit substations of 100 to 2000 kva. capacity. The most unique feature of the bulletin is a simple monogram which makes it possible to select the correct air circuit breaker.

19 TRUCKS—Clark Tractor, Division of Clark Equipment Co., has released a handy vest pocket catalog and instruction book on various models of utility trucks. Dimensions, capacities and descriptions of the trucks are included, also illustrations of the various models.

20 TRUCKS—The Howe Scale Co., has released Catalog No. 14 (supersedes all previous truck catalogs) describing and illustrating a complete line of 2- and 4-wheel hand trucks, trailer trucks, baggage wagons, dollies, wheels, casters and rubber-tired wheels.

21 TRUCKS—Towmotor Corp. new bulletin entitled "Lift Truck Operators Guide" gives helpful hints on the proper use of lift trucks in difficult places. The bulletin contains many clear-cut illustrations which can be easily followed.

22 WETTING AGENTS—The Johnson-March Corp. has released bulletin 100-M describing and illustrating the effectiveness of Compound-M, a scientifically formulated chemical which, when added to water, wets coal, ore, slate, shale, clay, silica and other dust by producing practically instant dispersion of the liquid over the dust particles.

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Blasting

(Continued from page 90)

that the condenser is shot through. This condition should be corrected at once and if no other condenser is available and the machine must be kept in service, the condenser should be cut out of the circuit entirely until a new one is obtained.

Testing and lubricating the machines should be done at regular intervals depending on the amount of use. When a machine is in steady use it should be tested for voltage at least once a month and oiled at least three or four times a year in-

ternally and a little oil or grease applied to the rack bar as often as needed. Far better results will be obtained by applying a little lubricant at regular intervals than waiting until a machine is dry and stiff and adding a lot more than actually needed. A daily or weekly check can be made on machines by the blaster himself with a small inexpensive test board. This board can be made small and compact and will prove to be very popular with the men who use these machines. It can be made very easy by fastening three ordinary lamp receptacles on a board. Connect the receptacles in series, bringing a

lead out from each one. Insert three 50-watt, 110-volt lamps in the receptacles and if a 100-volt machine is to be tested, use one lamp; if it is a 200-volt machine, use two and if a 300-volt, use three. Since these lamps are all connected in series 330 volts would be required to light them to full brilliancy. Connect the two outside leads to the machine and operate it as though a blast were being fired. If the lamps show a bright light, it is a good indication that the machine is all right but if they show only a dim light or none at all, something is wrong and the machine should not be used until repaired. This test should not be used to replace the meters but it will be very helpful to the blaster and he will always know that his machine is working properly before firing a blast.

Selection of a blasting machine depends largely upon the conditions locally and the work required. Whether the 150-volt or the 300-volt type is used is largely a matter of opinion on the part of the operator, but in either case it is extremely important to keep the machine generating the voltage it is supposed to produce. While it is possible to operate an electric generator at a high rate of speed and obtain much greater voltages than its rated capacity, the same applies to a blasting machine. The generator used might be driven from some outside source and far exceed the ratings given but since it is only possible to drive them as fast as the operation of the short stroke found in a rack bar will permit in the usual operation of the machine. For this reason, the manufacturers have designed a machine that will generate certain voltages under normal operating conditions, and it is these voltages that should be accepted and maintained as minimum values in testing these machines.

None of the tests or inspections outlined are complicated in any manner and can easily be performed by any one familiar with meters. Neither is it recommended to permit anyone not thoroughly familiar with the machines to make major repairs, in which case they should be returned to the manufacturer who has the facilities available to do the work. They are intended for those who are interested in knowing that their machines are in proper working order at all times and realize the importance of keeping mis-fires reduced to a minimum.

Buy Quarry

BIRMINGHAM SLAG Co., Birmingham, Ala., has taken over operation of the East Quarries at Rock Springs and Glencoe, Ala. Flux stone and agricultural limestone are being produced at these plants.



Why cost-minded producers are installing *Simplicity* gyrating screens

There's nothing mysterious about the outstanding sales success of *Simplicity* gyrating screens in the aggregate industry. Producers are simply comparing first costs, depreciation costs, maintenance costs, and production speed of *Simplicity* units. And they soon see that *Simplicity*'s give them by far the greatest value for their money.

Simplicity screens offer you a wealth of outstanding features including: Counterbalanced eccentric shaft; rubber-mounted screen corners, screens in four-way tension over doubly crowned surface, dust-sealed Alemite lubricated roller bearings; extra rugged construction.

You, too, will find that *Simplicity* gyrating screens will help you whittle down your processing costs, help you maintain greater production schedules. Write today for complete facts.



Right: A 5'x12' Model D double deck *Simplicity* gyrating screen.

Simplicity

ENGINEERING COMPANY • DURAND MICH.

Lime in Cement Kilns

(Continued from page 63)

It has been found by experience that the burning of lime is much more severe on the kiln linings than the burning of clinker, due to the fact that the kiln linings do not become coated with a protective layer. The formation of kiln rings, when burning lime, is also much more severe and it is necessary to shut down the kiln at about six week intervals to remove the slag. Then the other kiln (No. 1) can be started up, if the demand warrants. However, this slag has an analysis of 85 percent CaO, 8 percent SiO₂, and one percent R₂O, which qualifies it as a high-grade cement raw material. Accordingly, it is fed into the komi-nuturs with fresh raw material.

Lime kiln operation has been found more efficient than cement kiln operation for waste heat power purposes. And the combination of a kiln on each product has placed the mill in a very favorable position insofar as power development is concerned, since the lime kiln gases produce more power and the power load for grinding is much lower. The lime, of course, is not ground.

Hot gases pass through the lime kiln with less obstruction and the exhaust gases at the kiln discharge end have temperatures of 1200 deg. F. to 1300 deg. F., which are about 100 deg. F. hotter than the temperature of the gases from the cement kiln. Stack temperatures average 350 deg. F.

As a general average, with one kiln on cement and one on lime, the mill will utilize approximately 82 percent of the electrical power it develops. With two kilns on cement, the power plant will produce 85 percent of mill requirements. The heaviest power load is sustained when the raw grinding mill is in operation.

Standard A.S.T.M. test procedure is followed in the manufacture of lime, in the determination of available lime, silicates, ignition loss, etc. A slaking test is run every hour to check on the formation of core and scale which are indications of over- or under-burning. A 200-gm. sample taken from the discharge end of the cooler is slaked and screened over a 65-mesh sieve and the residue weighed on a balance. Specifications call for 90 percent CaO. Sieve analyses are run once a week, principally as a check on the fines. Fines through a 4-mesh sieve are limited to a maximum of 6 percent.

In converting the mill to calcine lime, mill changes were held to a minimum, for ready reconversion to cement manufacture. The biggest change has been the removal of the heat recuperators from the kilns, and these can be replaced in about two days. Gates under the slurry tank for stone storage can be sealed and the tank used for slurry again.

Manganese Steel Dredge Pumps In T.V.A. Wartime Projects

Tennessee Valley Authority's dual war assignment has been to supply additional electric power and to increase aluminum output from its territory.

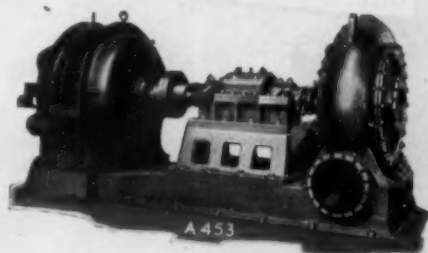
New dams were rushed to completion to provide deep lakes of impounded water; literally reservoirs of power. For the Appalachia and Ocoee dams, the Birmingham Slag Company of Birmingham, Ala., was the principal supplier of concrete aggregates, a large proportion of which was sand and gravel from the bed of the Tennessee River.

They had two hydraulic dredges on this project. One unit was primarily assigned to excavation, with the other as a standby machine to assure uninterrupted production when repairs were required. Both dredges are equipped with rotary cutter ladders for 50-ft. digging, and 15-in. Amsco type H Form 44 heavy duty dredge

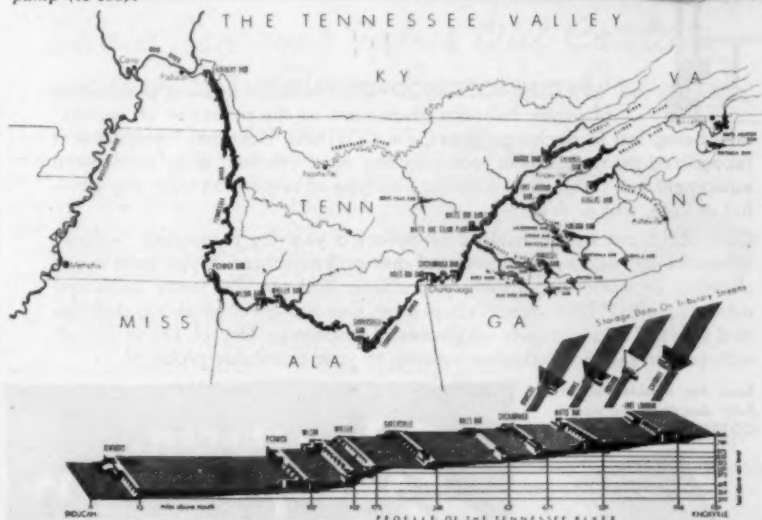
pumps, powered by 400 h.p. 440 r.p.m. electric motors. All materials were pumped direct to barges which were towed to the screening plant docks. An Amsco pump similar to those employed is pictured (A453).

The company has fulfilled every demand for aggregates on continuous 24-hour operations. The large volume of sharp aggregates handled under high velocity and pressure required dependable pump parts of long wearing life. Impact and abrasion resistant manganese steel, in Amsco water-end castings, played an important role in T.V.A.'s great war task.

Ask for bulletin on Amsco Dredge Pumps, Pipe Fittings and Rotary Cutters.



Amsco 15-in. type "H" heavy duty sand and gravel dredge pump (A-453).



Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois

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COMPANY

Lime Directors Meeting

(Continued from page 71)

chusetts Institute of Technology, reported results of the past year's research on structural lime. In view of the present agitation to include an autoclave test for structural lime, the result of these M.I.T. autoclave tests is of particular interest. They included three pressure hydrated dolomitic limes and three regular dolomitic hydrates.

Prof. Staley concluded: "It is apparent from these tests that insufficient knowledge of the reactions taking place in the autoclave is at

hand to determine whether the test is suitable for limes, or to fix a procedure or a limiting value for expansion for limes. It cannot be assumed that different limes will behave the same with the same cement under the conditions imposed by the autoclave. Since it is not possible to make an autoclave test on straight (neat) lime specimens, we have not been able to eliminate the possible variation that might be produced by the cement. A possibility that has not been investigated is that of drying the straight lime specimens a few days before autoclaving. It is certain that it would not be possible to



Mrs. Barton A. Ford, left; and Mrs. S. C. Sneed, to the right

use the 10-in. specimen for autoclaving. In any event, until we have determined what reactions occur under the conditions of the test, we can never do more than guess as to the significance of the test."

Tests on mortar were made of masonry assemblages of two matching halves of the same brick. Sand-lime brick were used because of the more uniform characteristics obtained with this kind of brick. Also tests were made for water retention of the mortar mix. Prof. Staley has no great respect for the present water retention test, which involves the use of a flow table, since no two flow tables are comparable. He did state, however, that the following summary of results were of some interest:

(1) The percentage flow-after-suction will vary with richness of mix, the leaner mixes affecting some limes markedly in this respect while others are not so affected. In general, it may be said that the leaner the mix, the lower the percentage flow after suction, though the reduction is small in the case of some limes.

(2) Characteristics or gradation of the sand appears to have little effect on the percentage flow-after-suction. Values obtained with Ottawa sand and graded brick sand do not show much variation. For purposes of comparative tests it is



A. R. Dunning, Strasburg Lime Co., Strasburg, Va.

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Amos B. Miner, National Gypsum Co., relaxes after golf game

best to use a standard sand even though the ordinary brick sands seemingly produce small variation in the results.

(3) Percentage flow-after-suction will vary with the cement:lime ratio. With certain limes the highest values were obtained with a 1:1 proportion of cement:lime, with higher or lower proportions producing reductions in percentage flow-after-suction. With other limes, the maximum was reached at approximately 2 parts of lime to 1 of cement, with the percentage flow-after-suction remaining practically constant with increasing lime content.

(4) The percentage flow-after-suction will vary with mixing water content. This is not a straight-line variation, and in practically every instance there is an inflection point or point of reversal of the curve illustrating the variation of flow with change in mixing water content. This indicates that there is a certain water content where maximum packing of the particles of lime and sand occurs or the forces acting between the particles are a maximum, and this results in a change of slope in the curve. The latter explanation is a plausible one due to the fact that the material in this range exhibits dilatant characteristics which is a phenomenon evidenced by colloidal materials.

Some further work was also done along the line of evaluation of workability of mortars, but this is rather involved for an abstract here.

(Continued on page 110)



J. S. Hedrick, vice-president Riverton Lime & Stone Co., Inc., Riverton, Va.

**EAGLE
WASHED
SAND
PASSES
99½%
CLEANLINESS
TEST!**



A long-time user of Eagle Sand and Gravel Screw Type Washers says, "We have used the 'Spiral Screw Washer' for twelve years without complaint. *Our material, classified with this washer, passes the State specifications and has a cleanliness test of 99½% which is without a*

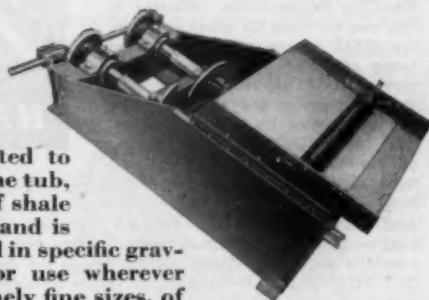
doubt very high . . . In regard to operating cost, the Eagle Washer has proved its worth many times over. Operating costs are absolutely nothing compared to the efficiency and output of the Spiral Screw Washer."

EAGLE IRON WORKS
133 Holcomb Avenue
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Shale Remover Takes Out Contamination of Close Specific Gravity

For plants having a high percentage of foreign material of similar specific gravity in their aggregate, the Eagle Shale Remover attachment for screw washers is a money-maker. Fitted to the water discharge end of the tub, the Shale Remover takes off shale and other foreign material and is adjustable to any differential in specific gravity. It is recommended for use wherever graded sizes, but not extremely fine sizes, of materials are produced. Let us give you additional details.

Details on Shale Removers and many other Eagle profit-earning sand and gravel equipments are given in Catalog 44. Send for a copy.



EAGLE *Specialized Sand and Gravel Equipment*
"SWINTEK" DREDGE LADDERS — SCREW WASHERS
LOG WASHERS — DEHYDRATORS — SAND TANKS
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"SERVING INDUSTRY FOR OVER SEVENTY YEARS"

Plaster Research

Considerable research has been done looking to reestablishment of lime plaster. Various lime hydrates, dolomitic, high calcium, adhesive hydrate (made by hydration with a dilute acid) and pressure hydrated dolomitic limes were tried in combination with portland cement and gypsum plasters.

The original part of this work was based on the assumption that 30 p.s.i. tensile strength at 16 hours would be necessary in the scratch coat. This was obtained with a 60:40 portland cement:lime mix; with high early strength portland cement a

50:50 mix, both by weight. Using adhesive lime and standard portland cement the mix proportions were 55:45. With either moulding plaster or unfibred gypsum a 50:50 mix by weight gave 30 p.s.i. Also mixes with pulverized limestone were tried. No conclusions were reached other than that several of these mixtures had possibilities.

The rest of Prof. Staley's report dealt with sedimentation or settling rate tests, which may be a part of a general specification for chemical or industrial lime. Distilled water was used as the medium.

Prof. Staley reported: "The sedimenting characteristics of any lime

are affected by time of soaking before initial shaking (of the test tube), solubility, time of sedimentation, temperature, kind of water used, procedure of sedimentation (stirred or free settling), particle size, shape, etc. Unless these factors are controlled, comparable results cannot be obtained between laboratories, or even in the same laboratory." The rest of the report was a mathematical analysis to determine, if possible, constants and coefficients involved.

Bureau of Standards

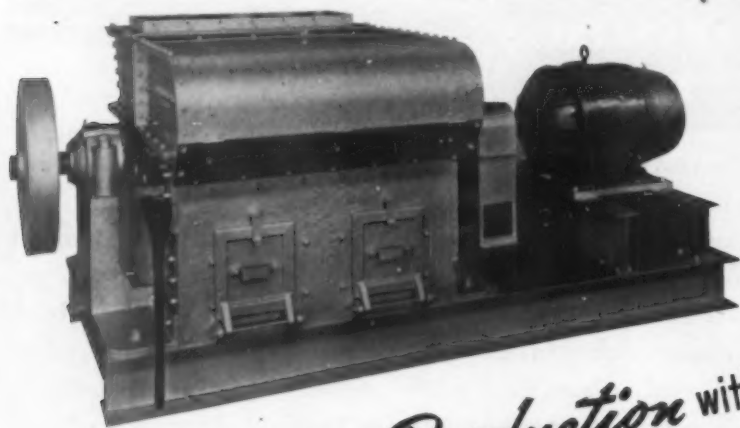
DR. G. J. PINK, research associate of the National Lime Association, National Bureau of Standards, reported on a more or less independent research on mortars. The following paragraphs are of the most interest:

Since it is quite probable that some requirement limiting either the amount of unhydrated oxides or the expansion of limes for structural use will shortly be included in the Federal specifications, much of our time during the past few weeks has been devoted to this problem. An analysis of the results of autoclave tests made by seven laboratories was prepared and the report on this will be presented to Committee C-7 of the A.S.T.M. at the annual meeting in June. It was apparent from this analysis that a performance test, such as autoclave expansion, would be preferable to a limit on unhydrated oxide content as a specification requirement. However, none of the data submitted by any two of the laboratories was strictly comparable, owing to differences in the limes used or differences in the conditions of test, and it was therefore impossible to arrive at any definite conclusions as to just what conditions should be used in the test and what limit should be specified for expansion. It was evident that further information was needed and additional tests were therefore recommended.

Our present investigation is so planned that the results should help to clear up some of the questions which have arisen. It should aid in the establishment of a satisfactory test for expansion and a reasonable specification limit. Close cooperation with the Lime and Gypsum Section of the Bureau is being maintained in all the work. Data on the expansion of eleven different hydrated limes under a variety of conditions have been obtained, and ultimately a much larger number of limes will be tested in order to insure inclusion of all types.



W. W. Sprague, vice-president, National Mortar & Supply Co., Pittsburgh, Penn., resting after a stiff golf game



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THE POSITIVE FEED CRUSHER

Positive mechanical feed is an exclusive, patented feature of Dixie Non-Clog Hammermills. Differing in this respect from all other crushers, the DIXIE breaker plate, instead of being stationary, is a continuously moving belt of manganese steel links. Clogging and slowing down are eliminated by the mechanical feed afforded. No manual pushing of material is needed. Even the most plastic, wet, clayey material will not slow production or clog hammers.

And because the DIXIE moving breaker plate can be moved forward or backward from the hammer points, quality and size of production can be carefully controlled. These are but two of the outstanding DIXIE features. GET YOUR COPY of the booklet, "More Efficient Crushing of Raw Materials," containing the complete facts about DIXIE Non-Clog Hammermills. Write today for your copy.



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Cooperation is being maintained with the various committees interested in the development of specifications for limes and mortars, and with the technical committee which is handling questions relative to the A.S.A. masonry code. Much of the information developed in the course of the Fellowship work has been useful in selecting methods of test and the establishment of property requirements for the various specifications. The data already at hand, together with that which we hope to obtain from the work now under way, should be increasingly helpful in the future toward substantiating any proposals made by the lime industry, and in defending it against any unreasonable requirements or specifications which might be proposed.

Lime in Concrete

PROF. WALTER C. VOSS, Massachusetts Institute of Technology, reported progress in the research on the effect of lime in concrete. Data are being assembled for a complete scientific paper for the A.S.T.M., or the American Concrete Institute. In general, progress confirms previous conclusions that lime is most effective in lean mixes. The most significant conclusion, perhaps, is that lime reduces the shrinkage of concrete, and gives concrete with less amplitude of expansion and contraction; in other words a more stable concrete.

Structure of Lime

Although not presented in person, a progress report was available on the study of lime particles by X-ray and electron microscope at the University of Illinois by Dr. GEO. L. CLARK and JOHN P. TORDELLA. The study has proceeded far enough to classify magnesium oxide into three kinds of particles, in order of their chemical activity: (1) flake, (2) needles, (3) rods. Some samples are mixtures of these shapes. From the shape of particle, the properties of the oxide can be predicted.

The following quotation is of considerable commercial significance:

"Previous experiments have been completely verified to the end that temperature of calcination of the original rock determines the subsequent ease of hydration both of CaO



GREAT GUNS!

..... Powered by a MORRIS Pump

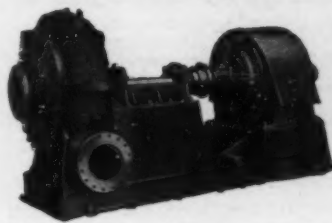
This hydraulic giant is "caving down" a bank of dense, hard, clayey material through the pressure developed by a MORRIS Centrifugal Pump.

The particular MORRIS pump application illustrated above happens to be an unusually spectacular illustration . . . but thousands upon thousands of other MORRIS Pumps are undramatically, yet faithfully and effectively, performing their task of handling liquids and materials of every kind.

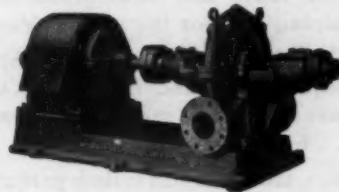
For 80 years, MORRIS has specialized on the "hard-to-handle" services . . . the kind of jobs for which other designs do not have sufficient stamina, capacity, or efficiency. If you have a difficult pumping problem, don't give it up . . . instead, give it to the MORRIS engineers. Write for bulletins on MORRIS Pumps for services in which you are interested.



Sam Snead, Kimbalton Lime Co., Shawsville, Va.



Heavy-Duty Lined Dredging Pump



Double Suction Horizontally Split Pump
for Clear Liquids

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MACHINE WORKS
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CENTRIFUGAL PUMPS

and MgO. No commercially available limes studied have failed to hydrate in the CaO part of the mixture to Ca(OH)₂, but commercial dolomitic limes vary widely in the ease of hydration of the MgO, ranging from extreme resistances to rapid hydration under very mild conditions. It has been possible to distinguish clearly between adsorbed water on the MgO which still retains some degree of activity and reaction to Mg(OH)₂. The effect of grinding of resistant dolomitic limes upon hydration of the MgO has been carefully studied both in ball mills and in colloid mills. In spite of certain claims in the lit-

erature and also patents, this means of hydrating MgO has not been as successful as steam pressure or autoclaving methods, or treatment with excess water in boiling temperatures."

Registration List

W. W. Sprague, National Mortar & Supply Company, Pittsburgh, Penn.
F. J. Collins, The Kelley Island Lime & Transport Co., Cleveland, Ohio.
R. G. Greeves, The Kelley Island Lime & Transport Co., Cleveland, Ohio.
T. R. Boyd, Office of Price Administration, Washington, D. C.
Fred Witmer, The Ohio Hydrate & Supply Co., Toledo, Ohio.
S. Walter Stauffer, National Lime Association, Washington, D. C.

W. Vernon Brumbaugh, National Lime Association, Washington, D. C.
G. J. Fink, National Lime Association, Washington, D. C.

Walter C. Voss, Massachusetts Institute of Technology, Cambridge, Mass.

Howard R. Staley, Massachusetts Institute of Technology, Cambridge, Mass.

Amos B. Miner, National Gypsum Co., Buffalo, New York.

Dean Crandell, National Gypsum Co., Buffalo, New York.

Mr. & Mrs. L. R. Cambron, Cumber Lime Manufacturing Co., Ocala, Fla.

A. R. Dunning, Strasburg Lime Company, Strasburg, Va.

E. C. Powers, The Marble Cliff Quarries Company, Columbus, Ohio.

Nathan C. Rockwood, Rock Products, Chicago, Ill.

Bror Nordberg, Rock Products, Chicago, Ill.

J. A. Dunaway, Peery Lime Co., North Tazewell, Va.

Reed C. Bye, Warner Company, Philadelphia, Penn.

C. C. Loomis, New England Lime Co., Adams, Mass.

J. H. McNamara, Eagle Rock Lime Co., Eagle Rock, Va.

Abraham F. Myers, Washington, D. C.

H. D. Brigstocke, Thomasville Stone & Lime Co., Thomasville, Penn.

B. L. Corson, G. & W. H. Corson, Inc., Plymouth Meeting, Penn.

Mr. & Mrs. J. P. Gruber, The Valve Bag Co., Baltimore, Md.

Mr. & Mrs. Burton A. Ford, St. Regis Paper Co., Baltimore, Md.

Mr. & Mrs. Leroy Gruber, Toledo, Ohio.

P. L. Rogers, Riverton Lime & Stone Co., Riverton, Va.

J. S. Hedrick, Riverton Lime & Stone Co., Riverton, Va.

C. A. Stokes, Riverton Lime & Stone Co., Riverton, Va.

S. A. Phillips, Pit & Quarry, Chicago, Ill.

W. A. Wilson, Pit & Quarry, Chicago, Ill.

Mr. & Mrs. S. C. Snead, Kimbalton Lime Co., Shawsville, Va.

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Rugged, dependable, easy to handle and maneuver because of Osgood measured air control, these shovels, pile drivers, drag lines and cranes are doing outstanding work in ALL kinds of going . . . from rubble to rock.

Soon, thanks in part to their performance in this country and abroad, Osgoods again will be available to the construction field. Until that day, keep your Osgood in action with preventive maintenance;

BUY ANOTHER WAR BOND TODAY!

<p>THE GENERAL EXCAVATOR COMPANY CRANES, DRAGLINES AND SHOVELS DIESEL, GAS, ELECTRIC</p>	<p>Associated with The General Excavator Company</p> <p>OSGOOD</p> <p>THE OSGOOD COMPANY • MARION, OHIO</p>	<p>OSGOOD SHOVELS, DRAGLINES CRANES EXCAVATOR & WHEEL DRILLING DIESEL, GAS, ELECTRIC</p>
--	--	---

Defluorinating Phosphate

REPORTS from the Tennessee phosphate field state that work is proceeding on the new T.V.A. plant for production of defluorinated fused phosphate rock for feeding purposes. This treated phosphate product is used as a substitute for bone meal and bone products now inadequate. Shippers of ground phosphate rock have been extremely busy, the bulk of the cars going to Illinois, Indiana and Kentucky farmers on both A.A.A. contracts and to private purchasers.

Trucks Wearing Out

WITH approximately one in every six civilian truck requests being approved, the truck picture in the United States has changed completely in the past two years since rationing began in March, 1942, according to a recent statement by C. T. Ruhf, president of Mack Trucks, Inc. To date a backlog of 1,250,000 potential truck sales have accumulated and the total is growing. At present 19 percent of the trucks on the road are at least 10 years old, and a minimum of eight percent are more than 15 years old. Most of these older vehicles would be off the highways in normal times.

Segregation in Stockpiling

(Continued from page 65)

materials would give the best results if the mixture was composed of aggregate graded identically the same as the representative samples. If the grading, however, were coarser or finer than these, which, because of segregation is more probable than improbable in the field, marked reduction in slump, change in workability, and as much as a 500-lb. reduction in strength could be expected, provided there was no variation in retained moisture.

Surface Moisture Studies

All of the above tests were made with thoroughly dried materials and under close laboratory control in order to avoid any possibility of adverse influence caused by the presence of surface moisture. It was therefore necessary to investigate still further, the effect segregation of aggregate would have on the amount of surface moisture in the different aggregate combinations used in some of the above mixes.

This was done by inundating the combination of average materials numbers 2S and 2G and then allowing all of the free water to drain off by decantation. It was found that this combination retained 6.9 percent moisture.

After combining sand 3S and gravel 3G in the same proportion, inundating the mixture, and then draining off all of the free water it was found that this combination retained 9.1 percent moisture, or 2.2 percent more water than that retained by the combination of 2S and 2G, the representative materials.

To determine what effect this additional retained moisture would have on the quality of a mix designed for the use of representative materials containing a representative amount of surface moisture, mix number 4-73 was made, using identically the same weights of cement, sand 3S, and gravel 3G, as in the designed mix but increasing the amount of water in an amount equal to 2.2 percent of the weight of the aggregate. The additional water changed the water-cement ratio from .73 to .905. This increase in water, representing only the difference between the retained moisture in 2 SG and that in 3 SG, it is assumed, would remain constant for any similar difference in grading.

This mix slumped 7 in. instead of 1½ in., the slump of its comparable mix number 3-73. Its strength dropped to 2440 p.s.i. in 28 days. In this case segregation of the aggregate not only affected the strength because of the difference in grading but also changed the amount of retained moisture in the aggregate to such an extent that the resultant



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Here's a dramatic demonstration of light-weight pipe performance on a tough assignment.

In the project of de-watering Steep Rock Lake, more than a mile of large diameter Naylor Lockseam Spiralweld Pipe is literally carrying away the lake at the rate of 7 inches a day. In all, this distinctive light-weight pipe must handle 121 billion gallons of water before the deposits of iron ore can be tapped.

Only NAYLOR PIPE Combines All These Advantages

- Always accurate in diameter.
- Concentric ends match correctly.
- Easier to install.
- Holds true cylindrical form.
- Stays tight and leakproof.
- Stronger—safer.
- Handles jobs normally requiring heavier-wall pipe.
- High salvage value.
- Light weight saves steel.
- Cuts maintenance costs.
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Sizes: 4" to 30" in diameter—all types of fittings, connections and fabrications.

Naylor's exclusive structural advantages enable this light-weight pipe to make light work of gulping 2 million tons of water a day.

That's why Naylor is specified for such services as dredging, hydraulic sluicing, de-watering, ventilating, exhaust and intake and other applications of high and low pressure air and water lines.



LOCKSEAM
SPIRALWELD PIPE

**NAYLOR PIPE
COMPANY**

1237 East 92nd Street
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(Continued from page 113)
concrete failed to meet any part of the specification.

In conclusion, these tests, it is claimed, indicate that segregation very definitely affects the quality of concrete in every respect. It interferes with the uniformity and strength to a far greater extent than the probable human error. It can make a very workable mix design become an extremely unworkable and harsh concrete. It can make a plastic mix too stiff to work or too sloppy to use, and can reduce the 28-day strength as much as 1000 p.s.i. or about 30 percent.

These differences account for a big percentage of the expectant error

all of us have been allowing for since the advent of strength designed mixes. They also prove, according to the author's investigation, that closer separation of aggregate sizes to be recombined at the concrete mixer and better storage methods are not only desirable but mandatory if the industry hopes to progress or if concrete is to retain its present popularity as a construction material.

Mica Preparation

(Continued from page 76)
quality block and film. Therefore, manufacturers may have their choice of confining their production to the number of condensers they can make from their allocation of the usually

accepted capacitor mica, or use lower quality mica and thus increase their production of these units. This policy should increase the use of lower quality mica for capacitors. Stocks of this grade of mica have been increasing rapidly during the year. On stained quality, the next lower quality to good stained, stocks have also been materially increased.

HALF TRIM:

Mica trimmed on two adjacent sides with no cracks extending from the trimmed sides. (Fig. 1.)

THREE QUARTER TRIM:

Mica trimmed on all sides with no cracks extending from two adjacent sides and no cracks extending into the pattern. (Fig. 2.)

FULL TRIM:

Mica trimmed on all sides with all cracks, reeves, and cross grain trimmed out. (Fig. 3.)

PUNCH:

Punch mica must have a clear usable area, free from cracks and other visible defects, of not less than 1 in. in diameter and the total area of each piece must not be more than five times the usable area.

Use of Mica

Over 90 per cent of the world's production of sheet mica is normally consumed by the electrical industries. This is due to the fact that mica is the most valuable dielectric known.

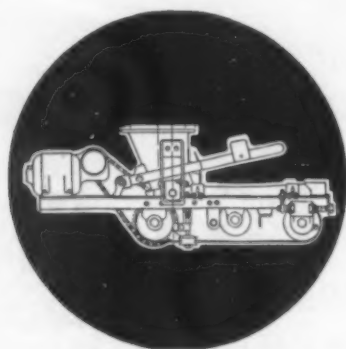
Strategic mica is fabricated into articles of many shapes that in turn are incorporated in various equipment used by our armed forces. Most important of these are electric equipment for cars, trucks, tanks, and planes. Due to the high temperatures and mechanical shock inherent in plane motors only spark plugs made of mica will stand up. Next in importance are communications equipment, radar, acoustic apparatus, and X-ray equipment. All incandescent bulbs, radio, and electronic tubes contain one or more small pieces of punch mica. Electric motors and generators contain insulating rings, sleeves, bushings, brush holder studs, and commutator-segment insulators fabricated from mica. Other vital articles containing mica are condensers, transformers, heating elements, induction coils, grid rheostats, and fuses.

The electric value of mica is determined by measuring its dielectric strength. Dielectric Strength is the term used to denote the property that mica possesses of resisting the passage of an electric current. This unit of measurement is expressed in volts per mil. (0.001 in.) of thickness.

Dielectric Constant is the relation of the capacity of two condensers of identical shape and size, one having mica or any other suitable material, and the other having air as the insulating medium.

Power Factor or dielectric loss of mica is the ratio, usually expressed

(Continued on page 116)



A Feeder That Does the "Impossible"

No one would believe that a Hardinge Constant Weight Feeder installed in front of almost any pulverizer will increase the capacity of that pulverizer 10 to 25%—unless he installed a feeder for his own use or checked the results of others. That is not all! A record of the weight fed is also kept. The unit is sturdy and inexpensive.

When an item costing 5% of the unit it serves can increase capacity 15%—it is worthy of your investigation now!



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NEW YORK

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TORONTO

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when buying a
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or Crane

LIMA



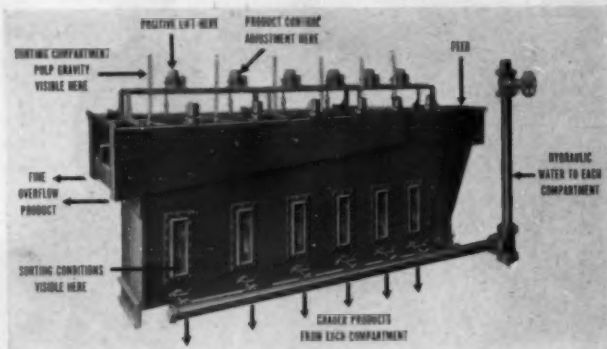
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The Dorco Sizer is a highly developed hydraulic classifier working on the "hindered settling" principle, which greatly magnifies the differences in settling rates between particles of varying size and specific gravity.

The grading of products both as to size and density down through the fine micron range can be controlled by the Sizer to an accuracy hitherto unknown. Its two main applications are the accurate grading of materials into closely sized groups and the separation of valuable minerals from unwanted gangue bodies, as in ore concentration.



The Dorco Sizer is being used successfully in the grading of specification sand and the sizing and concentration of phosphate rock where up to 6 graded sizes are required.



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RESEARCH AND TESTING LABORATORIES WESTPORT, CONN.

SUGAR PROCESSING

PETREE & DORR DIVISION 570 LEXINGTON AVE., NEW YORK 22

Mica Preparation

(Continued from page 114)

as per cent, of the total power loss to the total volt-amperes supplied the condenser. The extent to which mica will heat and its power loss under an electric load are of great importance if the mica is to be used in condensers. Direct measurement of the heat generated when mica is electrically charged is impracticable, but the power factor furnishes a reliable guide as to the amount of this heat. Mica with a high power factor will generate much heat and one with a low power factor little heat. The power factor of mica, therefore, determines its suitability for use in condensers.

Recent Developments in Testing

The large increase in production of domestic mica brought about by our government's program resulted in a heavy production of mica of lower quality for which there was relatively little demand for military purposes.

The Mica-Graphite Division of the War Production Board realized from the start that one of the best means of overcoming the shortage of high quality mica was to find military uses for that of the lower grades. It has been their policy to allocate for radio tubes, spark plugs and electrical insulators a lower quality mica than was formerly used. This move

decreased materially the demand for the better grades of mica. It was recognized, however, that use of lower grade mica in condensers would involve some highly technical problems. Since more mica is consumed in the manufacture of condensers than in any other single use, this same division of W.P.B. requested the National Research Council to investigate the problem. The Council set up a research project conducted by the Bell Telephone Laboratories, the object being to determine whether mica that heretofore was considered unsuited for condensers might be proven suitable.

In the course of the study, the Bell Telephone Laboratories developed suitable instruments for testing the electrical properties of this grade of mica. It was soon discovered that when various grades of low quality mica were tested they were found free of conducting veins and spots and were as low in power factor loss as mica free from stain. A limited number of condensers made from this type of mica were found to be as satisfactory as those made from higher quality mica. The number of condensers made, however, were far too small to draw any definite conclusions. It was necessary therefore to enlarge the study by making and testing an adequate number. This new testing program is still under way.

Construction in 1944

WAR PRODUCTION BOARD reports that the total volume of construction for 1944 will be \$3,500,000,000 as compared with the \$3,900,000,000 estimate last fall. Total volume of construction activity in the United States in the first quarter was under \$900,000,000, which is less than 40 percent of the volume of construction put in place in the corresponding quarter of 1943. The volume of plants complete or substantially complete increased to approximately \$10,000,000,000 during March, or 64 percent of the cumulative program to date. Nearly \$450,000,000 of projects were completed during March.

The total volume of construction activity in March was \$288,741,000, a two percent decline from February. This volume comprised: (1) total military, \$56,597,000; (2) industrial plant expansion, Government and privately financed, \$71,844,000; (3) housing, Government and privately financed, \$62,300,000; and (4) all other construction, public and privately financed, including public roads, sewer and water, community buildings, farm, utilities and other non-residential, \$98,000,000.

QUINN-ROBBINS Co., Inc., Boise, Idaho, are contemplating installing grinding equipment to produce additional sand passing 16-mesh and approximately 30 percent, passing 100.

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Also Makes 1 1/4", 3/4" or Agricultural Limestone in One Operation



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of "Slugger" showing
heavy duty hammers,
liners and discs.

By reducing large rock to 1 1/4", 3/4" or agricultural limestone in one operation, the "Slugger" has enabled operators to produce these sizes at a low cost per ton and with small investment.

Features include—Manganese steel hammers, heavy duty SKF bearings, adjustable breaker plate, hammer adjustments overcome wear, economical to operate.

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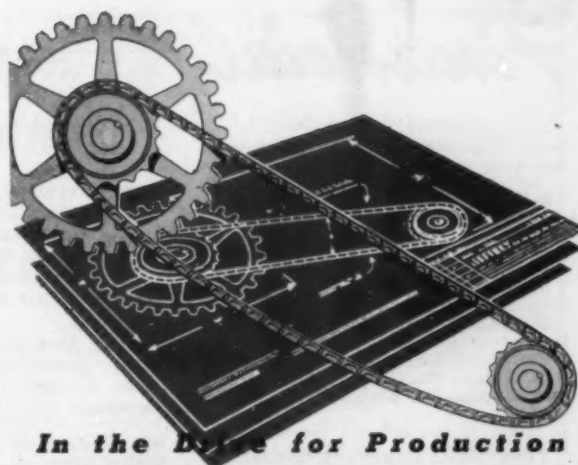
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DAVENPORT LOCOMOTIVE WORKS
A DIVISION OF DAVENPORT BESLER CORPORATION, DAVENPORT IOWA

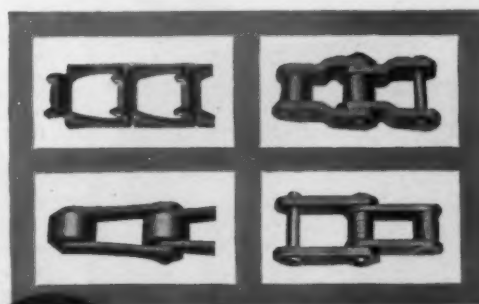


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No matter how skillfully a plant is laid out — how efficiently a production line is planned — non-stop operation depends on the strength, quality and wear resistance of the individual working parts.

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Financial

RECENT DIVIDENDS

Basic Refractories	.10	June 15
Industrial Silica Corp.		
Amount Payable		
6½% pfd. (p100) (arrear)	\$1.62½	June 10
National Gypsum Co. pfd.	1.12½	June 1
Pennsylvania-Dixie Ce- ment Corp. pfd. ....	.50	June 15
Pennsylvania Glass Sand Corp. ....	.25	July 1
Pennsylvania Glass Sand Corp. pfd.	1.25	July 1
U. S. Gypsum Co. ....	.50	July 1
U. S. Gypsum Co. pfd.	1.75	July 1

LONE STAR CEMENT CORPORATION, New York, N. Y., reported a net profit of \$458,226 for the three-months' period ended March 31, 1944. This compares with \$681,369 for the comparable first quarter in 1943. Sales for the first quarter in 1944 totaled \$6,205,382 as against \$7,251,363 for the first quarter of 1943.

PETOSKEY PORTLAND CEMENT Co., Petoskey, Mich., had a net loss of \$155,734 for the year ended December 31, 1943, as compared with a net profit of \$132,527 for the year ended December 31, 1942. Net sales in 1943

were \$1,143,054 as against \$2,041,172 in 1942.

PENNSYLVANIA GLASS SAND CORPORATION, Lewistown, Penn., showed a net profit of \$134,586 for the three months ended March 31, 1944. This compares with \$150,482 for the three months ended March 31, 1943.

NEW ENGLAND LIME Co., Adams, Mass., presented the following income account for the years ended December 31:

	1943	1942
Net sales	\$400,474	\$426,289
Cost of sales	385,968	378,893
Selling, etc., expense ..	83,847	92,101
Depr., depl., etc.	41,135	35,981
Operating loss	110,476	80,686
Other income	139,714	132,210
Total income	29,240	51,524
Earn., \$100 bond.	\$5.43	\$9.57
Interest	18,834	16,143
Fed. income taxes.	3,000	9,000
Net income	7,406	26,381

¹ At rate of 3½% (1942, 3%).

ALBERENE STONE CORP. OF VIRGINIA, New York, N. Y., with plant at Damon, Va., has reported a net income of \$22,235 for the year ended December 31, 1943, as compared with \$46,407 for the twelve months ended December 31, 1942.

MONOLITH PORTLAND CEMENT Co., Los Angeles, Calif., reported a net deficit of \$220,906 for the year ended December 31, 1943. This compares with \$180,716 net profit for the year ended December 31, 1942.

MONOLITH PORTLAND MIDWEST Co., Los Angeles, Calif., had a net profit of \$71,556 for the year ended December 31, 1943, as against earnings of \$121,856 for calendar year 1942.

MARQUETTE CEMENT MANUFACTURING Co., Chicago, Ill., reports current assets totalling \$4,397,278 as of December 31, 1943. This compares with \$4,497,533 for December 31, 1942. Current liabilities on December 31, 1943, were \$1,000,318 as against \$1,067,676 on December 31, 1942. Net current assets at the end of 1943 were \$3,396,959 as compared with \$3,429,857 at the close of 1942.

PENNSYLVANIA-DIXIE CEMENT CORPORATION, New York, N. Y., had a net income of \$262,374 for the 12 months ended March 31, 1944, which compares with \$951,560 for the 12 months ended March 31, 1943. Net sales for the year ended March 31, 1944, were

"PENNSYLVANIA" STEELBUILT HAMMERMILLS

will enable Producers to efficiently and profitably meet their quota of the 15,000,000 ton Agstone program set for 1944—with the assured cooperation of the Government in the matter of supply.



Operators investigating current performance, for guidance in the selection of preferred equipment, will find "Pennsylvania" REVERSIBLE Hammermills rendering outstanding service, as result of—

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- Automatic Hammer and Cage Bar Resharpening
- Reduced Power Demand
- Sharply Cut over-all Maintenance Cost.



Fifteen (15) sizes permit wide selection for various plant capacities.

On receipt of specifications, we will gladly furnish the desired information and cooperate with layout suggestions, and a list of representative installations.

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Philadelphia 7, U. S. A.

\$6,962,493 as against \$11,459,656 for the year ended March 31, 1943.

UNITED STATES GYPSUM Co., Chicago, Ill., showed a net profit of \$1,087,053 for the three months ended March 31, 1944, after federal income taxes. This compares with \$1,123,342 net profit for the first quarter in 1943.

YOSEMITE PORTLAND CEMENT Co., Merced, Calif., will hold a special stockholders meeting June 12, 1944, to approve the sale of the properties and assets to Henry J. Kaiser Co. and other buyers. It is estimated that approximately \$1,830,000 will be available for distribution or about \$7 a share on the preferred. Nothing would be available for class A or class B common. A total of \$565,000 would be received from the Henry J. Kaiser Co., for the cement mill and equipment, and \$1,135,000 would be realized from the sale of marketable securities and from other assets. Included in the total distribution would be about \$131,496 net earnings for 1943. The Kaiser Co. plans to move the cement mill and machinery to Venezuela, South America.

MATERIAL SERVICE CORPORATION, Chicago, Ill., showed the following income account for the years ended December 31:

	1943	1942
Net sales	\$10,279,137	\$16,062,889
Cost of sales	8,606,488	13,462,745
Selling & gen. expense	1,108,477	1,549,360
Oper. profit	562,171	1,050,784
Other inc., net	522,171	192,743
Total income	1,084,342	1,243,527
Inc. & prof. tax	454,500	649,600
Post-war, etc., res.	500,000	.....
Net profit	129,842	593,927
Dividends	76,563	76,563
Surp. for year	53,279	517,364
Earn. surp., 1-1	4,476,907	3,515,355
Pr. yr. adjust. ....	.....	cr 444,188
Earn. surp., 12-31	4,530,186	4,476,907
¹ After depreciation and depletion: 1943, \$322,956; 1942, \$417,113.		
² Includes \$430,779 other operating income.		
³ Less post-war credit.		

PACIFIC COAST AGGREGATES, INC., San Francisco, Calif., reported a net profit of \$36,087, after taxes, depreciation and depletion, for the three months ended March 31, 1944. The net profit for the three months ended March 31, 1943, was \$111,447. Sales for the first quarter in 1944 were \$1,280,419 as against \$1,635,476 for a similar period in 1943.

NATIONAL GYPSUM Co., Buffalo, N. Y., had a net profit of \$233,918 for the first quarter of 1944 which compares with a profit of \$179,283 for the first three months of 1943. Net sales in the first quarter of 1944 were \$5,728,196 which compares with sales of \$4,788,229 for the first quarter of 1942. President Baker pointed out that despite a decrease in government business and restrictions in residential building, the company continued to enjoy a good business in its various lines.

Protection from Burn-Outs with PYRASTEEL

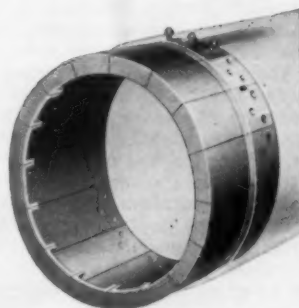
KILN ENDS

Why run the risk of kiln-end "burn-outs" that cause serious shutdowns and costly repairs!

Play safe by installing PYRASTEEL Segmental Kiln Ends at both the discharge end, as illustrated . . . and also at the feed end of your cement kilns.

PYRASTEEL gives long and dependable service at high temperatures . . . as proved in scores of installations throughout the industry.

Write for Bulletin of this
Heat-Resisting Alloy



Showing discharge end of cement kiln fitted with PYRASTEEL Segmental Kiln Ends.



Unit segments are easy to install or replace.

CHICAGO STEEL FOUNDRY COMPANY
PYRASTEEL for high temperatures
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Makers of Alloy Steel for 32 Years
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Brownhoist Buckets

**ROPE REEVE •
POWER WHEEL • LINK TYPE**

Handling ore, gravel, coal or dirt Brownhoist Buckets do a better job because: 1) Larger sheaves reduce rope wear, 2) Heavy carbon-steel digging lips take deep clean bites, 3) Extra-sturdy construction insures long-life. Write to Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York, Philadelphia, Pittsburgh, Cleveland and Chicago.

Federal "Interventor" In Mexican Cement Plants

To avoid black market operations in the distribution and sale of cement, the Mexican government has issued a decree which empowers the Secretary of National Economy to regulate the traffic and control the production of cement, bars of corrugated iron, tin sheets and conduit pipe. This action was necessitated by the tremendous shortage of these materials. The enormous public works program of the government and the hoarding of construction materials has created a shortage which is said to be affecting the national economy.

The order of priority for these materials follows: 1—National Defense; 2—National Marine; 3—Communications and Public Works; 4—Mexican Petroleum Industry; 5—National Committee of Irrigation; 6—Federal Committee of Electricity; 7—National Railroads of Mexico; 8—Department of the Federal District and other official dependencies. There is a further breakdown of priorities for construction materials which gives precedence to the needs of hospitals, sanitariums, factories, followed by apartment buildings and finally private homes.

In many respects, the priority system set-up is very similar to that

now in effect in the United States. Every factory producing construction materials will have a "federal interventor" whose duties will include inspection to see that the materials will be shipped to jobs having the higher priority. Expenses for the administration of the priority system will be borne by the producing industries with a one-percent tax on the fixed official prices to be imposed.

Lightweight Aggregate

CONCRETE UNITS, INC., New York, N. Y., has developed a process for the manufacture of a new lightweight aggregate to be known as Sinter-Lite. Louis Gelbman, president of the company, advises that this new development has been perfected by Frank Leftwich, engineer authority on lightweight aggregates. This process, which has been patented, consists of sintering the heavy, glassy slag and fly-ash products of burning pulverized coal which removes any combustible residue. The process produces what is claimed to be a high grade, uniform, strong aggregate, light in weight, light in color, and free from carbon, sulphur and other deleterious matter.

Pan American Highway

LIMA, PERU, will be host to the Fifth Pan American Highway Congress scheduled from July 15 to July 25. Among other questions, the Congress will consider the necessity of altering highway pavement and bridge structures to facilitate heavy cargo and military traffic. Of approximately 13,400 miles of the present Pan American Highway south of the border, less than 1000 miles remain impassable in the dry season.

Largest Concrete Pipe?

LARGEST REINFORCED CONCRETE PIPE on record is said to have measured 12 ft. 8 in. in diameter, and was used on a job by the Metropolitan Water District of Southern California, according to F. M. Kettenring, president of Graystone Concrete Products Co., Seattle, Wash. This pipe was 12 ft. long and had a 13-in. shell. Each section weighed 43 tons.

ERIE TRUCK MIXER PLANTS

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1406 Seventeenth St.
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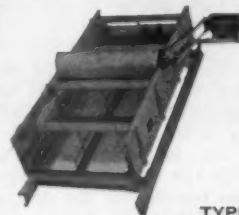
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TYPE
"MR" 42"x96"

UNIVERSAL VIBRATING SCREEN CO.

RACINE — WISCONSIN

Sand Recovery

(Continued from page 55)

sand before screening it out he will change the character of the clay particles; and in any event, in plant operation, he is likely to lose most of the —50-mesh and —100-mesh material unless he introduces special measures to recover it; and he will want to know what it is like in its native state, not as a dry material. The percentage of these fines in the whole sample, on a dry basis, can be readily determined for the purpose of a specification *dry* screen analysis.

We said in the article in the May issue that testing sieve sizes No. 4, No. 8, No. 14, No. 28, No. 48 and No. 100 were the most important. This statement was based on the Concrete Manual of the United States Bureau of Reclamation, first edition, 1938. A later edition (1942) requires the use of No. 4, No. 8, No. 16, No. 30, No. 50 and No. 100 testing sieves. These latter are the standard sizes used in the A.S.T.M. specifications also. Both sets were selected, apparently, because the relationship between particle sizes screened with them is approximately in a logarithmic ratio and hence gives, when plotted on squared cross-section paper, a nearly straight-line curve for a perfect grading.

In his series of articles on "Washing and Classifying Sand," in the December, 1939, and January, 1940, issues of *Rock Products*, the author (the late Edmund Shaw) had a good deal to say about plotting testing sieve analyses of sand, to which we will refer again in subsequent articles. However, his purpose was to demonstrate the *effects* of various processing changes on gradation of sizes. Here we are attempting to approach the whole problem of processing by using a screen or sieve analysis of the raw materials that we must deal with from the start. In other words, instead of the operator seeking means to correct deficiencies in his finished products, let us see how the processing can be approached so as to minimize the deficiencies.

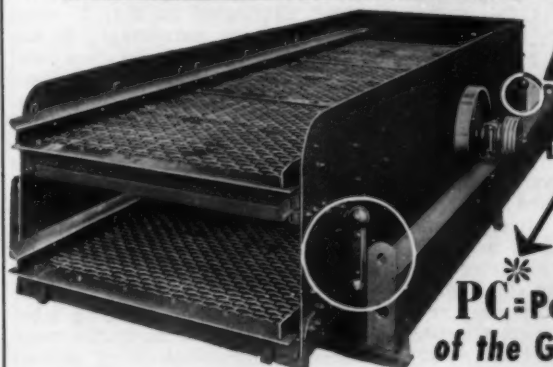
The specifications the operator will have to meet will probably give limiting percentages "retained on," or "passing" certain sieve sizes, and very often limits on the "finesness modulus." For example, present specifications (1942) of the Bureau of Reclamation require a finesness modulus (explained later) of not less than 2.50 and not more than 3.00, and the results of test screen analysis to be within these limits:

Screen size	% retained on (cumulative)
No. 4	0 to 5
No. 8	10 to 20
No. 16	20 to 40
No. 30	40 to 70
No. 50	70 to 88
No. 100	92 to 98

(Continued on page 122)

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... the only vibrating screen with **PC***



PC* = Positive Control of the Gyration Action

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**IMPROVES GRADING
MINIMIZES BLINDING
because
every square inch of
screen goes to work**

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E. C. MACHIN COMPANY
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ALLENTOWN, PA.

Sand Recovery

(Continued from page 121)

The same size analysis would be expressed in terms of "passing" the test screens, as follows:

Screen size	Percentage passing
No. 4	95 to 100
No. 8	80 to 90
No. 16	60 to 80
No. 30	30 to 60
No. 50	12 to 30
No. 100	2 to 8

Either screen analysis can be plotted on simple squared paper as shown in Fig. 1. The circular dots represent the upper limits and the square dots the lower limits of the various sizes. By adding the cumulative percentages of the sizes retained on the various size screens, as $0 + 10 + 20 + 40 + 70 + 92 (= 232)$ and dividing by 100, we get the "fineness modulus," as in this case of the lower limit material would be 2.32, which is too coarse a material. For the upper limit it is $5 + 20 + 40 + 70 + 88 + 98$ divided by 100, or 3.21, which is too fine a material.

Both these are outside the specification limits given of 2.50 to 3.00, so that any sand that will just pass the size limits on either side would not necessarily come within the fineness modulus limits. The A.S.T.M.

standard specification for fine aggregate requires that the fineness modulus of material from any one source must not vary more than ± 0.20 or -0.20 from that fixed in the specification. Obviously, the sand you, the operator, make to meet the specification, illustrated in Fig. 1, when plotted by size percentages in the same manner illustrated here, will fall within the shaded area between the two gradings shown in Fig. 1.

While we have never seen it done, it would appear to us to be an excellent idea for the plant operator or superintendent to plot the specification size limits, as shown for one particular specification in Fig. 1, for each of the various specifications he is called upon to meet. Let these be plotted on transparent tracing cloth, cellophane, or similar material; label these and keep them handy for ready reference. Specifications of various state highway departments will probably continue to vary, and city building codes will require different specifications than those of highway departments.

Having acquired a set of these "master charts," the plant operator can make as many screen analyses of his own finished product during the day as conditions call for, on the same scale chart, and by putting the correct master chart over his present or current finished product chart, he can readily determine if he is

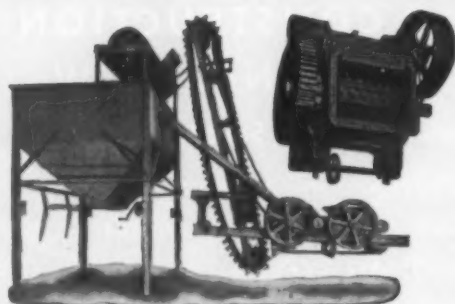
keeping within specification limits—in other words he will have a simple control test. This is getting somewhat astray from the subject that we started on—to select the plant processing methods by comparing a screen analysis of the raw material with the finished product required by the specification; but we like to pass on these ideas as they come to us, for we might forget them while developing the subject in perhaps a more logical manner.

So, we will leave the reader at this point, to dry and make sieve tests of his raw material, and plot the results as described in this article. According to the A.S.T.M. standard method for making a sieve analysis, the sample of dried material should not be less than 500 grams (fine aggregate), and should be carefully selected by quartering a larger sample. Care must be taken not to overheat the sample in drying—the temperature must not go over 230 deg. F. The reason for this is, apparently, so as to change the character of the clay particles as little as possible. The less accurate the scales, the larger the sample should be, and calculations will be simpler if a 1000 g. sample is sieved. Also, of course, there will be less error in the larger sample percentages because of loss from dust which escapes or clings to the screens.

(To be continued)

McLANAHAN

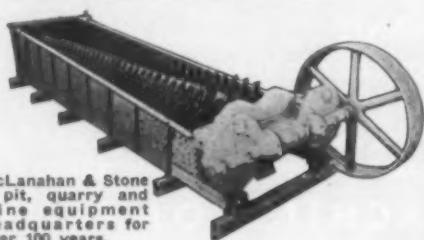
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Difference in Agstone

OHIO farmers who apply agricultural liming materials have been advised by Earl Jones, extension agronomist, Ohio State University, to compare the values of the different kinds of limestone and also to consider how rapidly the calcium contained in the material will be needed by the plants. He pointed out that the finer limestone is ground, the more rapidly its calcium can be taken up by plants. In limestone screenings, only 43 percent of its calcium content becomes available the first year and only 59 percent within a period of four years after application. Most Ohio farmers, he said, buy agricultural ground limestone of which 40 to 60 percent will pass a 100-mesh screen. When it is applied to soil, plants can get 80 percent of the calcium content the first year and 91 percent within four years.

To get the same immediate beneficial effect on soil as is secured when 2000 lbs. of agricultural ground limestone is applied two or three months before seeding, a farmer would have to apply 3400 lbs. of limestone screenings, 2850 lbs. of coarse limestone meal, or 2400 lbs. of fine limestone meal. Hydrated lime releases calcium even more quickly than ground limestone and an application of 1350 lbs. of ordinary hydrated lime will have the same effect on soil acidity as 2000 lbs. of ground limestone. There may be cases, said Mr. Jones, where hydrated lime is the cheaper material to use.

Produce Agstone

THE HAYES CONSTRUCTION CO., Bethany, Mo., is planning to enlarge its agricultural limestone crushing capacity by setting up a plant in the "city quarry." For the present, stone blasted from this quarry will be taken to the crushing plant at the old quarry operation.

Mica Needs Men

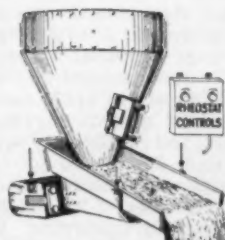
ONLY about 20 percent of the mica requirements of this country are produced in United States mines, according to a Washington report. One of the bottlenecks to increased production is the lack of labor for the mines and rifting shops.

Buy Sand Company

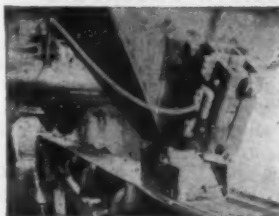
THE OCKLOCKNEE SAND CO., Tallahassee, Fla., has purchased The Middle Florida Sand Company and will operate the combined operations under the name of The Middle Florida Sand Company.

Soap to Mica

THE WARREN SOAP CO., Cambridge, Mass., is operating a mica mine in Wilmot, N. H., known as the Powell mine. Fred Guardali is superintendent of the plant. Feldspar is a by-product of this mining operation.



"Adjustable Power" ELECTRIC VIBRATORS



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Gypsum Demand Up

For the first time since the third quarter in 1943, the downtrend in over-all activity of the gypsum industry has been halted in the January-March period of 1944. Bureau of Mines reports, however, that this favorable showing may represent only a temporary halt in the long-term downtrend as a larger than usual proportion of the demand for gypsum products during the past winter has been in sections where cold weather does not seriously curtail construction. This factor may be offset in succeeding periods by the relatively lower demand in the remainder of the country in which the construction season starts early in spring. Although the decline in the gypsum industry has not been as severe as in construction, it is not likely that gypsum activity could trend upwards over an extended period while construction would be declining at a rapid rate. New construction has been estimated by the Department of Commerce to have fallen 60 percent below that of the first quarter of 1943.

Crude gypsum mined in the January-March, 1944, period totaled 919,692 tons, a gain of 8 percent over the comparable 1943 period. Calcined gypsum for the first quarter of 1944 totaled 629,470 tons, an increase of 15 percent. On the other hand, port-

land-cement retarder production in the first quarter dropped 46 percent to 109,758 tons. Agricultural gypsum jumped 96 percent to 109,758 tons. Base-coat plaster increased 17 percent to 121,778 tons; sanded plaster spiraled up 45 percent to 21,075 tons. Lath increased 39 percent to 160,176,000 sq. ft., and wallboard went up 30 percent to 354,334,000 sq. ft. Sheathing, laminated board, however, showed decreases of 27 and 19 percent, respectively, dropping to 35,747,000 sq. ft., and 41,603,000 sq. ft. Tile showed a small increase of four percent.

Western Phosphate

PHOSPHATE PRODUCTION in the western states during 1943 dropped off 14 percent from the record total of 265,665 long tons reached in 1942, going to 228,680 tons, with a P₂O₅ content of 72,730 long tons. The Bureau of Mines reports that the total value was slightly more than a million dollars. In 1943 the production came from Idaho and Montana, but Utah was inactive. Average P₂O₅ content of the western states phosphate rock sold or used in 1943 is reported as 31.80 percent.

Idaho rock sold or used in 1943 (108,916 long tons, with 34,709 tons P₂O₅ content) was about five percent less than the record production of 1942 (114,079 tons). The same two companies were active in this State

in 1943 as in 1942. By far the larger of these, the Anaconda Copper Mining Co., operated its No. 3 mine at Conda, Caribou County. Most of the Conda shipments in 1943 were to Anaconda, Montana, for conversion to superphosphate. Much smaller quantities were used for the production of phosphate chemicals, for direct application to the soil, for animal feed, and for fertilizer filler. Some was exported. The other producer, the Teton Phosphate Co., Boise, Idaho, shipped phosphate rock from its holdings in Bear Lake County near Montpelier. Most of this material was sold for direct application to the soil. A small quantity was shipped for use in animal feeds.

Montana was the largest phosphate rock producer of the Western States group in 1943 as in 1942, although its lead in sales (10,848 long tons) was not nearly as great as in 1942. Its sales in 1943 (119,764 tons, with a P₂O₅ content of 38,021 tons) were 20 percent less than the record made in 1942 (150,402 tons). Montana in 1943 had but one producing company, the Montana Phosphate Products Co., of Trail, British Columbia. This company operated the Anderson mine near Garrison, as well as several Federal leases in Powell County. It leased the property of the Mineral Hill Mining Co., near Avon, Powell County, on July 7, 1943, and operated it after that date.

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AIR COMPRESSOR—I. R. Duplex, 100 HP, motor and receiver. Capacity 585.
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- 1—3 1/2 x 40 ft.
- 1—7 x 56'
- 1—10 x 90 ft., and others.

CRUSHERS

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FEEDERS

- 2—BAILEY FEEDERS, Type No. 3, complete with steel hoppers, 8 1/2 ft. dia. x 12 ft. cone bottom.

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- 5 x 22 ft. TUBE MILL.
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- 2—4-roll RAYMOND MILLS.

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- 1—8 x 9 1/2 x 180 ft. And others.

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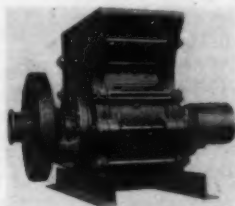
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MIXERS

"HIGH DUMP"

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Mixers—Pumps—Hoists
Paving Equipment

or "LOW CHARGE" TYPE



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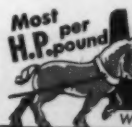


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WISCONSIN ENGINES

Yes... even the little Model AA 1 hp., single-cylinder Wisconsin Air-Cooled Engine has its 2 1/4"-bore cylinder honed to a high mirror finish... to assure smooth, full-power operation and maximum fuel and maintenance economy.

No "hidden detail" of design and construction is neglected or sacrificed to "price expediency" in the manufacture of these fine engines. These details are important to YOU in the operation of your equipment. Wisconsin air-cooled engine power is the answer.

Most
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MILWAUKEE 14, WISCONSIN, U. S. A.

World's Largest Builders of Heavy-Duty Air-Cooled Engines

SPECIFY MACWHYTE Preformed



... the Correct Rope for your equipment

**made to meet
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MACWHYTE COMPANY

2949 Fourteenth Ave., Kenosha, Wis.
MILL DEPOTS: New York, Pittsburgh, Chicago
Ft. Worth, Portland, Seattle, San Francisco
Distributors throughout the U. S. A.

(Continued from page 47)

Study Cement Transportation

A Task Group of cement company executives has been appointed to study the transportation of portland cement. It has held one meeting with representatives of the W.P.B. for preliminary discussion of the problems involved. It is planned to make a report to W.P.B. not later than June 15, 1944. Cement companies have again been invited to offer comments on items of the agenda at the February 25th meeting of the Advisory Committee. A number of companies offered suggestions in response to that invitation and some had previously offered comments and criticism of Order T-1, which were given consideration in the amendment of T-1, issued on January 12, 1944. Carl F. Clausen, Chief, Non-Metallics Section, Building Materials Division, W.P.B., reports that present estimates show domestic requirements for portland cement in 1944 will be approximately 66,338,000 bbls. The Task Group membership includes the following:

J. F. Neylan, vice-president, Lone Star Cement Corporation, New York, N. Y.; M. Moss Alexander, president, Missouri Portland Cement Co., St. Louis, Mo.; John M. Mallon, sales manager, Louisville Cement Co., Louisville, Ky.; D. S. MacBride, vice-president in charge of sales, Her-

cules Cement Corporation, Philadelphia, Penn.; and H. O. Warner, vice-president, Ideal Cement Co., Denver, Colo.

OPA Survey on Ready Mix

As a result of a meeting held in Washington, D. C., April 28, before Karl Mathiasen, Price Executive, Building Materials Branch, O.P.A., and Fred Bamman of Mr. Mathiasen's staff, a committee has been formed within the ready mixed concrete industry to confer with O.P.A. concerning problems arising out of the recent order increasing cement prices by 20c a bbl. in the Northeastern States. If a spot check confirms the oral statements alleging need for relief, O.P.A. may be expected to grant such relief. If in specific districts in the area the ready mixed concrete industry shows a "red ink position" in 1943, O.P.A. will accept that fact as the basis for immediate relief; in other districts where deficits were not encountered in 1943 but where the outlook for 1944 is such as to indicate the possibility of deficits, relief will also be granted. Mr. Bammon is making the field study for O.P.A. The industry committee is composed of Stephen Stepanian, Alexander Johnson, Robert Collins, William Moore, and V. P. Ahearn, according to a recent announcement from headquarters of the National Ready Mixed Concrete Association.



For Fast, Accurate, Continuous—

WEIGHING

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PROPORTIONING

Raw Mix—Finish Grind

Use FEEDOWEIGHT

MERRICK SCALE MFG. CO. 188 ALUMINUM STREET
PASSAIC, NEW JERSEY



NEW

**... for still greater
capacity in producing Agstone and
the finer Aggregates—at low cost**

NEW HOLLAND MODEL 30

- Adjustable swinging hammers with renewable multi-point hammer tips.
- Welded steel plate construction.
- Adjustable breaker plate.
- Tramp iron pocket.
- Heavy duty roller bearings.
- And other features.

Write Industrial Division for complete details about the new Model 30 and the complete line of New Holland hammer and roll crushers.

NEW HOLLAND MACHINE CO.

NEW HOLLAND, PENNSYLVANIA

Coal Shortage

WITH STOCKPILES of coal in the nation reduced this spring to 53,000,000 tons, miners under 26 being drafted, and a larger export demand, the prospects for the winter of 1944-45 do not look any too promising. The federal government is campaigning to relieve this situation by urging coal consumers to store as much coal as possible. Bureau of Mines representatives are offering their services for suggestions as to proper storage methods to prevent spontaneous combustion, efficient firing practices, and the preparation of coal for utilization of its maximum b.t.u. content.

Build Shop and Garage

THE SALEM SAND AND GRAVEL CO., Roseburg, Ore., has secured a permit for the construction of a \$6000 concrete building to be occupied as an office, machine shop and garage. The building will serve as headquarters for the company's extensive operations and the repair and housing of equipment.

Power Shortage

THE LEHIGH PORTLAND CEMENT CO., Metairie Falls, Wash., plant recently had to reduce operations to one kiln due to a power shortage caused by low water supply in Sullivan Lake.

GRUENDLER CRAFTSMANSHIP

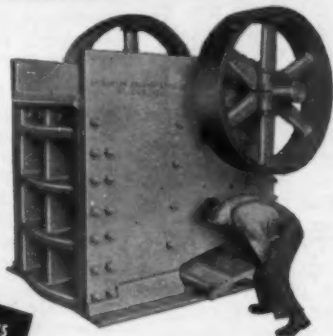
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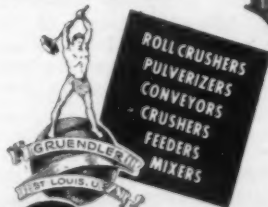
These heavy plate and cast steel constructed roller bearing JAW CRUSHERS have tremendous crushing power. Built to take it for continuous operation with minimum maintenance. Built in all sizes, stationary or portable.



Complete weight of 25x42
JAW CRUSHER is 54,200 lbs.

Mfrs. of Double Roll Crushers and
Hammer Crushers for Secondary
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ALLIGATOR V-BELT FASTENERS



● Alligator V-belt Fasteners and the open-end V-beltting now being made by belting manufacturers, will enable you to make up multiple V-belt drives from roll belting. These fasteners have been on the market 9 years and are now being used on a wide variety of drives.

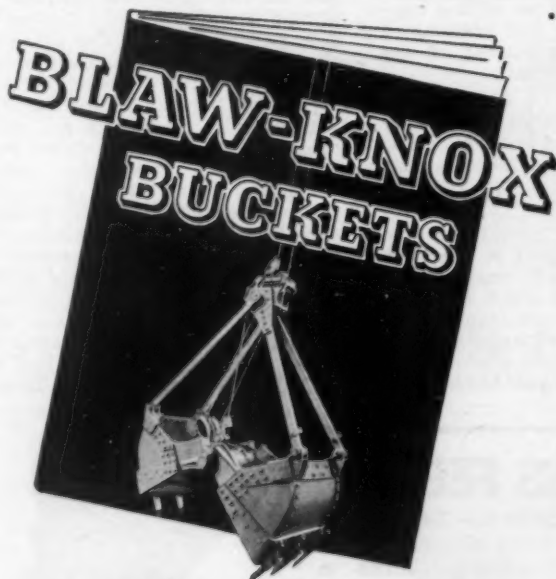
Available for B, C, D sizes of belt for industrial use and 1-in. and 2-in. sizes for railroad use. These fasteners, however, should not be used for repairing endless cord V-belts.

Bulletin V-205 will give you complete details as to where and how these fasteners are used, sizes, list prices, tools and application instructions. A copy will be mailed at your request.

Order from your supply house

FLEXIBLE STEEL LACING COMPANY
4684 Lexington Street, Chicago 44, Illinois

Also sole manufacturers of Alligator Steel Belt Lacing for flat transmission belts and Flexco MD Belt Fasteners and Rip Plates for fastening and repairing conveyor belts.



Write Headquarters for the Catalog You Need

No. 1586—Blaw-Knox Concrete Buckets.

No. 1606—Blaw-Knox Buckets for Contractors.

No. 1696—Blaw-Knox Buckets for Single Drum Hoists for use on Railroads, Mills, Foundries, Etc.

No. 1745—Blaw-Knox Buckets for

"Burtoning" handling Nitrates, Grain, Potash, Etc.

No. 1787—Blaw-Knox 2 Line Lever Arm Buckets for Rehandling, Barge Cleanup, General Purpose, Hard Digging, Dredging.

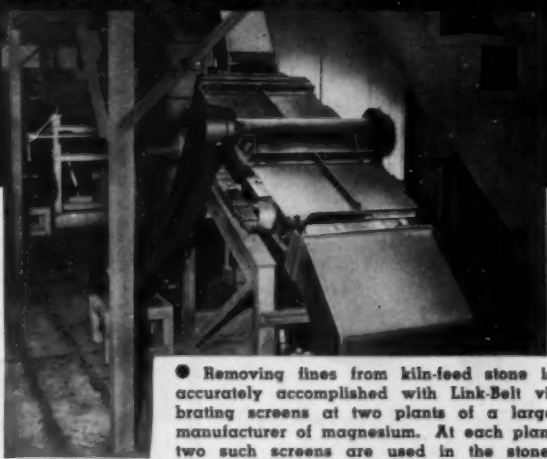
No. 1865—Blaw-Knox 4 Rope Buckets for Coal, Ore and Cleanup.

BLAW-KNOX DIVISION of Blaw-Knox Company

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Aid in the Production of Magnesium



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RYERSON STEEL ^{IN STOCK}

Call Ryerson when you need steel — any kind, shape, or size. Large stocks are available at ten convenient plants. Ask for a Ryerson Stock List — your guide to quick shipment of steel.

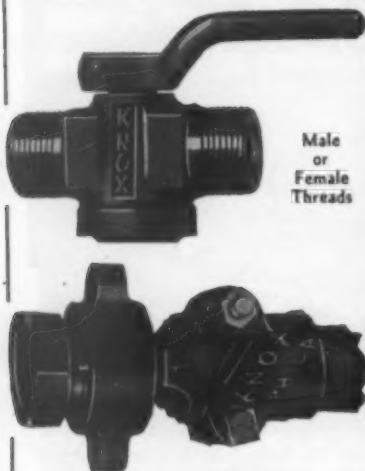
Principal Products Include:

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OBITUARIES

LESLIE J. BENNETT, president of the Buffalo Cement Co., and a pioneer builder in Buffalo, N. Y., died April 24 after a week's illness. He was 83 years old. Mr. Bennett's father also had been president of the company.

FRED RADANDT, operator of a sand and gravel hauling and concrete block manufacturing business in Manitowoc, Wis., for over 30 years, died May 4 at the age of 57.

SAMUEL F. HENSEL, owner of the Hensel Sand and Gravel Co., New Philadelphia, Ohio, died recently following a six week's illness. He was 78 years of age. Prior to his entrance into the sand and gravel business, Mr. Hensel operated the Hensel Transfer Co. for many years.

ARTHUR D. HART, proprietor of the Hart Sand and Gravel Co., Auburn, Wash., died recently at the age of 60.

LUCIUS P. YALE, vice-president of the Illinois Sand and Gravel Co., Chicago, Ill., died recently at his home. He was 78 years of age and had been ill two years. Mr. Yale was president of Yale & Reagon Co., a contracting firm with offices in St. Louis and Chicago, until his retirement several years ago. Since retiring and the dissolving of the construction firm, he had maintained his office as vice-president of the sand and gravel company.

GUILFORD M. HUMPHREY, manager of the Logsdon Sand and Gravel Co., Hannibal, Mo., passed away recently at his home.

HARRY A. LINCH, manager of the engineering department of The Dorr Co., New York, N. Y., passed away recently. Mr. Linch was a native of Steubenville, Ohio, and obtained his technical training at Ohio State University, from which he graduated in 1913 with the degree of Mining En-

gineer. After leaving college he went West and gained a thorough knowledge of the cyanidation of gold and silver ores while working in various positions with the Mogollon Mines Co., Mogollon, N. M. From January, 1921, until August, 1933, when he was made manager of the engineering department, Mr. Linch served The Dorr Company in many capacities.

NEWTON I. STEERS, who retired two years ago as president of the Du Pont Film Manufacturing Corp., died May 15 at his home in White Plains, N. Y. He was 67 years old. A native of Brooklyn, N. Y., Mr. Steers started work at 16 with an uncle, James MacBeth, a manufacturer of blasting supplies, soon becoming vice-president and general manager of the firm. He joined the Du Pont organization in 1904, when James MacBeth and Co. was acquired by Du Pont interests.

HARVEY WARREN HOLLINGSWORTH, office manager and treasurer of the New England Lime Co., Adams, Mass., passed away recently after an illness of three weeks. He was 62 years old. Mr. Hollingsworth was born in Brookhaven, Miss., and had been associated with the New England company since 1925.

Pan American Congress

ORGANIZATION of a National Section of Pan American Institute of Mining Engineering and Geology is now under way with the following elected to the National Directorate: Chairman, Edward Steidle, Dean, School of Mineral Industries, The Pennsylvania State College; vice-chairman, C. W. Wright, Chief, Foreign Minerals Specialists, United States Bureau of Mines; secretary-treasurer, A. T. Ward, mining engineer, New York, N. Y.; directors, D. P. Hewett, In Charge, Section of Metalliferous Deposits, United States Bureau of Mines; M. B. Gentry, vice-president, Freeport Sulphur Co., New York, N. Y.; T. T. Read, School of Mines, Columbia University; and W. E. Milligan, Department of Metal-

THE ROSS FEEDER

Completely controls the flow of any size material from Storage Bins, Hoppers or Open-Dump Chutes to Crushers, Conveyors, Screens, etc.

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lurgy, Yale University. The first Congress was held in Santiago, Chile, January 15 to 23, 1942. Plans for a second Congress scheduled for Rio de Janeiro, Brazil, in October, 1944, have been postponed due to the War.

New Incorporations

Montaup Sand, Gravel & Construction Corp., Fall River, Providence highway, Swansea, Mass., has been incorporated for construction purposes, with a capital of 300 shares of common stock, no par value. President and treasurer, Jos. F. Foley, 60 Foley Ave., Somerset; Clerk, Margaret M. Foley and Thos. J. Foley.

Dundee Sand & Gravel Corp., 175 W. Jackson Blvd., Chicago, Ill., has been granted a charter to operate and maintain a sand, gravel, mineral and water business, with a capital of 100 shares of common stock, par value \$100. Incorporators are Michael Bartenes, Pasquale Pettiti and Fred F. Prell. Correspondent is Julius L. Kabaker, 100 W. Monroe St., Chicago, Ill.

Sinter-Lite Corp., Wilmington, Del., has been organized to deal in concrete and concrete products, with a capital of 2000 shares, no par value. Principal office, Prentice-Hall, Inc.

Madison Sand & Gravel Co., Inc., Madison, Wis., has received incorporation papers to deal in sand, stone, gravel and other stone and minerals, with a capital of 600 shares, no par value. Incorporators are Harold M. Ziegler, Harold R. Bearbower, Erb Fischer, Chas. F. Gikerson, 1 W. Main St., Madison, Wis.

LaRue Silica Corp., Milwaukee, Wis., has been organized to mine, produce and sell silica sand and silica sand products, etc., with a capital of 250 shares at \$100 per share. Incorporators are William Corney, Mary Corney and Bessie Moroff.

Grants Fluorspar Mining Co., Grants, N. M., has filed incorporation papers and has been authorized to issue 2000 shares of no par value stock, of which 1000 shares have been issued. Incorporators are William Heim and W. F. Nance, both of Grants, N. M.; and Fred E. Wilson, Albuquerque, N. M.

Army-Navy Awards

Industrial Gear Mfg. Co., Chicago, Ill., has been awarded the Army-Navy "E" pennant for excellence in the production of equipment for the war.

Nordberg Manufacturing Co., Milwaukee, Wis., has been awarded the fourth star to its Navy "E" pennant and the third star to its Maritime "M" pennant in recognition of continued high standard of production of war equipment.

Farrel-Birmingham Co., Inc., Ansonia, Conn., has been awarded the Army-Navy "E" pennant for the fifth time to its three plants in Ansonia and Derby, Conn., and Buffalo, N. Y., for continued excellence in the production of war equipment.

Barber-Greene Co., Aurora, Ill., has won for the third time the Army-Navy "E" pennant for high achievement in the production of war material.

Worthington Pump & Machinery Corp., Worthington-Gamon Meter Co., Newark, N. J., is privileged to fly the Army-Navy "E" pennant as a result of excellence in the manufacture of war materials.

Firestone Tire & Rubber Co., Nebraska Ordnance Corp., Nebraska Ordnance Plant, Fremont, Neb., has won the coveted Army-Navy "E" pennant for excellence in the production of war materials.

St. Regis Paper Co., Fanelyte Division, Trenton, N. J., has been awarded the Army-Navy "E" pennant for excellence in the production of vital war material.

PULVERIZERS for the reduction of Cement Materials, Limestone, Agricultural Limestone, Fire Clay and All Dry, Refractory Materials.

Capacities: 1 to 60 tons per hour

Finenesses: 20 to 350 mesh

BRADLEY PULVERIZER CO.

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To Increase Capacities or Fineness of Present Grinding Plant—

To Reduce Power and Maintenance Costs—

To Insure an Absolutely Uniform Product—

Use the BRADLEY AIR SEPARATOR

Alpha products

Screw Conveyors Any Size and Gauge.
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for
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Woven Wire Screen

for

EVERY SCREENING PURPOSE!

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THE W. S. TYLER COMPANY, Cleveland

Moisture Absorption Survey by Block Industry

NATIONAL CONCRETE MASONRY ASSOCIATION, working through its Natural Aggregate Division, I. J. Westerveld, chairman, is sending out a questionnaire seeking information on maximum moisture absorption in sand and gravel concrete block. Some of the questions asked include: Kind of block machine used; process used; number of block per sack of cement; net block dimensions; percent of core area; average dry weight of

blocks; average strength of blocks at age of 28 days; curing methods; average absorption of blocks; type of cement (standard, high-early, etc.); kinds of aggregate; proportions of block mixture; what percent of fine aggregate passes 50-mesh, 100-mesh. It is suggested that three blocks be taken from stockpiles for the test in a recognized testing laboratory. Data from the test should be entered on the questionnaire and sent to E. W. Dienhart, executive secretary, National Concrete Masonry Association, 33 W. Grand Ave., Chicago. The

questionnaire is to be returned without signature in order to keep it anonymous.

Pavement Yardage

AWARDS of concrete pavement for April, 1944, have been announced by the Portland Cement Association as follows:

	Square Yards Awarded During April, 1944
Roads	333,840
Streets and Alleys	420,586
Airports	1,108,615
Total	1,868,041



"WIRE SCREENS?" SURE BILL—BUY 'CLEVELAND'-WE DO!"

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8 sizes boxed or in long lengths for wide conveyor belts. Best for rubber and fabric belts because it compresses belt ends and prevents fraying. Applied in a few minutes with a hammer. 2-piece hinged rocker pins.

Also, WIREGRIP Belt Hooks that fit any lacing machine. IMMEDIATE DELIVERY on both types.

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WILFLEY centrifugal SAND PUMPS



for Slurries, Sand Tailings
Slimes, Acid Sludges

Save Pumping Cost

Continuous operation without attention for long periods. Stuffing box, stuffing, gland water ALL eliminated. Close clearances maintained by easy slippage seal adjustment. Heavy

pumping parts of material best suited for YOUR particular problem. Complete engineering service. Prompt shipment of parts. The most efficient and economical pump you can buy. Write for Complete Catalog.

A. R. WILFLEY & SONS, Inc. Denver, Colo., U. S. A.
NEW YORK OFFICE: 1775 BROADWAY

DAY IN AND REHANDLING • TRENCHING •

Assure
A MOUTHFUL AT EVERY BITE

OWEN BUCKETS

DAY OUT • EXCAVATING • DREDGING •

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It costs but a few cents per cubic yard to dig, haul and dump a big load of any material with a SAUERMAN Power Scraper or Slackline Cableway. The low cost and large capacity of these machines is proved daily at hundreds of pits and quarries. SAUERMAN Machines are designed in suitable sizes and types to cover the requirements of every dig-and-haul job and each machine, whether large or small, offers the greatest possible economy of power and labor. Write for catalog.

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FARREL BACON CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants.

Engineering Service



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17 John St., New York, N. Y.

Manufacturers' News

The Dorr Co., New York, N. Y., has appointed Charles K. McArthur, well-known metallurgical engineer, as manager of the Eastern sales division, succeeding Dr. C. L. Knowles who resigned to accept the position of technical director of the General American Transportation Co.

General Electric Co., Schenectady, N. Y., has named Willard V. Merrihue manager of the advertising and sales promotion divisions of the apparatus department and a member of the apparatus sales committee. He was previously assistant to the manager of the apparatus publicity divisions, Robert S. Peare, who is now vice-president in charge of advertising, broadcasting and general publicity activities. Mr. Merrihue started work in the editorial section of the publicity department in Schenectady in 1925, immediately after his graduation from the University of Pennsylvania with a degree of bachelor of science in chemical engineering.



W. V. Merrihue

H. K. Porter Co., Inc., Pittsburgh, Penn., has made the following appointments: Joseph P. Gaffney, formerly with Frigidaire division of General Motors Co., has been placed in charge of the service and engineering office in the Alliance Bank Building, Rochester, N. Y., serving northern New York; R. W. Steves heads a similar office in Carew Tower, Cincinnati, Ohio, for major portions of Ohio, Kentucky, West Virginia and Indiana; W. T. Campbell, Philadelphia engineer, has been appointed manager for the district office in Girard Trust Bldg., Philadelphia, Penn., covering western New Jersey, eastern Pennsylvania, and Delaware; J. L. Cunningham, formerly with Burroughs Adding Machine Co., has been made field service engineer for northern New Jersey for the Chemical Process and Quimby Pump Divisions. He will make his headquarters at 340 Thomas St., Newark, N. J.

Chicago Steel Foundry Co., Chicago, Ill., has announced the appointment of N. A. Weston as general manager. He was formerly associated with Link-Belt Company.

Farrel-Birmingham Co., Inc., Ansonia, Conn., announces the appointment of Albert P. Leonard as manager of the New York office to succeed Edward S. Coe, Jr., who has been transferred to Ansonia as assistant to the plant manager.

LaPlant-Choate Mfg. Co., Cedar Rapids, Iowa, has been awarded the Army-Navy "E" pennant for the third time for high achievement in the production of war material.

Jewell Belt Hook Co., Naugatuck, Conn., announces the election of Charles L. Tolles as president of the company. George E. Bean was named secretary and treasurer, W. D. Calvert was appointed cashier and D. G. MacVicar, was made sales manager. Mr. Tolles, who is also president of the Hartford Belting Co., George E. Bean, L. A. Dibble, Emil Mannweiler and E. M. Beecher were elected directors for the ensuing year.

American Wire Fabrics Corp., a subsidiary of the Wickwire Spencer Steel Co., New York, N. Y., has announced the election of B. L. Weaver as a vice-president. He formerly was associated with the Pennsylvania Steel Corp., which was absorbed by the Bethlehem Steel Corp. in 1916. For the past two years he has been connected with the War Production Board as chief of the steel casting section. In his new position Mr. Weaver



Round Strand
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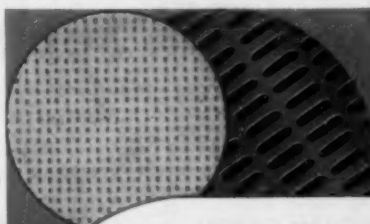
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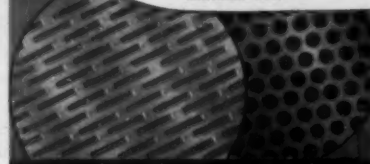


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Perforations are properly spaced to give maximum screening efficiency and strength.

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will have direct charge of operations at the Mt. Wolf plant, Mt. Wolf, Penn., where he will make his headquarters.

The Bristol Co., Waterbury, Conn., has opened a new branch office in Houston, Texas, located in the Citizens State Bank Building. D. D. Ault, who has been resident sales engineer in Houston for a number of years, will be in charge of the new office.

The Buckeye Traction Ditcher Co., Findlay, Ohio, has appointed A. M. Guthrie as field sales manager. He had been Eastern district manager at Philadelphia, Penn., since January, 1940. Prior to joining the company Mr. Guthrie was associated with the Paul Cochran Equipment Co. in Chicago, and before that with the R-B Equipment Mfg. Co., Royal Oak, Mich.

Westinghouse Electric & Mfg. Co., Pittsburgh, Penn., has elected four new vice-presidents: R. A. Neal, manager of the switch-gear division, East Pittsburgh works; J. K. B. Hare, manager of Central district sales activities, Pittsburgh; John H. Ashbaugh, manager of electric appliance division, Mansfield, Ohio; and H. H. Rogge, manager of the company's Washington Government office.

Wickwire Spencer Steel Co., New York, N. Y., has appointed Harry E. Rouffas as labor relations manager. For the past two years Mr. Rouffas has been connected with the War Production Board as a labor relations consultant, specializing in war plant production and labor problems. Prior to his connection with the W.P.B., he was with the Maritime Commission, the Inland Steel Corp. and the Firestone Tire and Rubber Co. Mr. Rouffas will make his headquarters at the Buffalo mill of the company.

The Austin Co., Cleveland, Ohio, has announced the appointment of J. K. Gannett, vice-president and eastern district manager since 1928, as director of engineering, in charge of engineering and research. Albert S. Low, vice-president,

now in charge of the Washington office, and A. F. Plant, vice-president and Detroit district manager, have been elected directors of the company.

The Timken Roller Bearing Co., Canton, Ohio, has appointed James F. Reid, former deputy chief of the Alloy Steel Branch of the W. P. B., as production manager of all divisions of the company. Mr. Reid had been production manager of the Steel and Tube Division.

United States Rubber Co., New York, N. Y., has appointed Alexander S. Basil assistant factory manager of the Lowell, Mass., plant.

The General Excavator Co., Marion, Ohio, announces that the plant and manpower facilities of Philips & Davies, Inc., Kenton, Ohio, have been enlisted by the company to meet demands for Super-cranes for the war. Production is according to General specifications and is earmarked 100 percent for Uncle Sam.

American Brake Shoe Co., New York, N. Y., announces that Maurice N. Trainer, first vice-president, has been elected a director of the company. Mr. Trainer has been vice-president of Brake Shoe since 1933, and was elected first vice-president in October, 1943. He has been president of the company's Brake Shoe and Castings Division since 1939.

Mack Trucks, Inc., New York, N. Y., has made the following sales department appointments: E. F. Vreeland, formerly district manager of the Bronx and White Plains, N. Y., office, has been named manager of the Albany, N. Y., branch in the northeastern division. M. J. Chollet has been appointed district manager of the St. Louis, Mo., branch, while C. L. McLure now heads the Louisville, Ky., branch. Cone T. Bass has taken over duties as division bus manager of the central division.

Joseph T. Ryerson & Son, Inc., Chicago, Ill., has made the following changes in executive personnel: Harold B. Ressler, vice-president, who has been located

at the New York plant, will move to the executive offices in Chicago, where he will be in general charge of sales in all territories; Ainslie Y. Sawyer, assistant to president, has been elected vice-president and will continue at Chicago in general charge of purchases; Harry W. Treleven, assistant manager of New York plant, is now manager of the plant; Thomas Z. Hayward, who was in charge of tubing sales and priorities, has been appointed assistant general manager of sales.

General Electric Co., New York, N. Y., announces that Robert S. Peare, manager of publicity and broadcasting since 1940, and chairman of the general advertising committee, has been elected a vice-president. In his new position, Mr. Peare will direct the company's advertising, broadcasting, and general publicity activities as a member of the president's staff. H. V. Erben, manager of the central-station divisions since 1941, has been elected a commercial vice-president.

Nordberg Manufacturing Co., Milwaukee, Wis., announces that Jack B. Bond, formerly with Galland Hanning Mfg. Co. and A. O. Smith Corp., has joined the sales and engineering staff of the crusher division of the company, with headquarters in Milwaukee, Wis.

Universal Engineering Co., Cedar Rapids, Iowa, has introduced a comprehensive designing, engineering and manufacturing service to take care of post-war production requirements, and places these facilities at the disposal of engineers, manufacturing and selling organizations who can use a central manufacturing and shipping point. This service can be used by firms that design machines and equipment but have no manufacturing outlet, also to take over the overflow production requirements of plants that are overloaded and for which expansion would be impractical at this time.

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The new model GAYCO Centrifugal air separator makes possible the uniform and increased recovery of fine material within a range of 40 to 400 mesh.

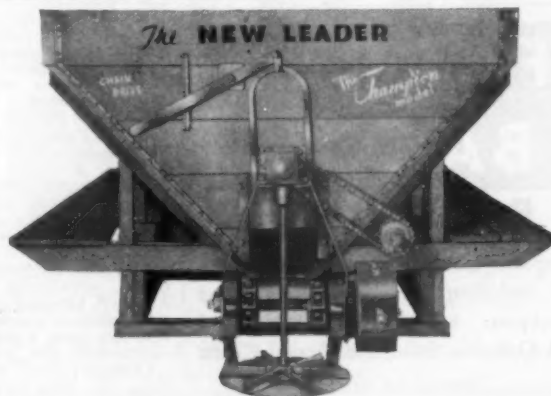
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- Not affected by variation in speed or rate of feed.



Manufacturers also of "Reliance" Crushers, Screens, Elevators, Conveyors, Bin Gates, Grizzlies, Complete crushing, screening and washing plants for crushed stone, sand and gravel.

Universal Road Machinery Co.

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These spreaders have all the characteristics required for profit-making spreading. They embody the latest spreading improvements. The extra-heavy-duty pintle type conveyor chain gives positive-feed for self-unloading. Will spread wet or dry lime uniformly from 35 to 45 ft. in width. Of heavy construction and reinforcement, they are built to stand hard usage.

Write today for our latest catalog showing the new model Wide Bottom, equipped with two distributor discs. This spreader will handle wet lime and marl and is strictly a one-man spreader.

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Width	Ply	Top-Bottom	Covers	Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"	20"	5	1/8"	1/32"
42"	5	1/8"	1/16"	20"	4	1/8"	1/32"
36"	6	1/8"	1/16"	18"	4	1/8"	1/32"
30"	6	1/8"	1/16"	16"	4	1/8"	1/32"
30"	5	1/8"	1/16"	14"	4	1/16"	1/32"
24"	5	1/8"	1/32"	12"	4	1/16"	1/32"
24"	4	1/8"	1/32"				

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

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"A" WIDTH All Sizes "D" WIDTH All Sizes
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	25 "	13.00
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No. 4 Telamith Gyratory Crusher—
30' steel elevator—30" x 12' screen—
20-ton Fairbanks Morse scales—
\$1,200.00.

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AIR COMPRESSORS
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18 Steel Ships 6 1/2 x 8 x 2 1/2.
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CATERPILLAR SHOVELS
3/4 Yd. Lima Diesel.
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3/4 Yd., 1 1/2 Yd., 2 Yd. & 4 Yd. MARION Electric.
1 Yd. NORTHWEST Gas.
1 1/2 Yd. LIMA Diesel.
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46-KOPPEL 1 1/2 Yd. 24 & 30 In. Ga. V Shaped.
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FLAT CARS
9-50 ton std. 80 heavy duty flat cars.
HOISTING ENGINES
Gas: 15, 30, 60, 100 & 120 HP.
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Steam: 6 1/2 x 8, 7 x 10, 8 1/2 x 10, 10 x 12, 12 x 24.

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75, 90, 180, 200 HP. P. M. Engines.
110 HP Ingersoll Rand Engine.
175 KVA Worthington 3/60/2300.
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10,000 Gal., 15,000 Gal. & 20,000 Gal. Cap.
SEPARATORS AND COLLECTORS
8, 10 and 14 ft. Separators, Gayco & Bradley.

ROLL CRUSHERS
36x60 Fairmount & 36x30 Diamond.

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10x8, 15x7 1/2, 14x7, 15x9, 15x10, 16x9, 16x12, 16x10,
18x11, 20x8, 20x12, 20x10, 20x12, 20x12, 20x12,
30x13, 36x15, 36x30, 36x18, 36x14, 36x9, 36x6,
36x10, 36x24, 42x9, 48x24, 48x30, 60x42, 84x66,
36x10, 9x36.

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5 No. 19, 25, 37 & 48 Koppers.
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4-No. 6, 3 & 6 Austin Gyratory.
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10 inch Austin Model 105.
6, 10 & 12 inch Superior McCullys.

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BELT: 1000 Ft. 60 in., 700 Ft. 40 in., 600 Ft. 36 in.,
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30 in. x 30 Ft., 3 Ft. x 30 Ft., 4 Ft. x 30 Ft., 54 in.
x 30 Ft., 42 in. x 24 Ft., 5 Ft. x 30 Ft., 6 Ft. x 16
Ft., 5 Ft. x 16 Ft., 6 Ft. x 16 Ft., 6 Ft. x 30 Ft.,
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CHECK YOUR NEEDS

Whatever you may require, if it is not listed here the chances are that through our Coast to Coast connections we can locate just what you want—whether it's a complete plant or a few individual items. The following listings are just a small part of what we have to offer. Lack of space prevents showing all. We also have an extensive list of shovels, cranes, draglines and other earth moving equipment.

CRUSHERS

- One (1) 10x20 Acme Jaw Crusher, ready to operate. Located in Pennsylvania.—Ref. 9800.
- One (1) No. 5 Austin Gyrotory Crusher, corrugated head, manganese head and concaves. Located Michigan. (8-1172)—Ref. 9801.
- One (1) No. 80 Austin Western 9x40 Jaw Crusher complete with feeder, discharge conveyors and mechanical feeder, powered with a Waukesha Model H143G motor, 6x6 1/2 serial number in 422930s—in excellent condition, mounted on four steel wheels. Located Texas.—Ref. 9802.
- One (1) Cedar Rapids Crushing Plant—Portable—9x36 jaw with set of rolls—16x16 conveyors. Model D-13000 Diesel. Located in Wisconsin. (8-4224)—Ref. 9803.
- One (1) 2540 R. B. Cedar Rapids Primary Jaw Crusher 42" 10" B. B. and R. B. Apron Feeder with Hopper, Supports, V-belt drive, D13000 Power Unit Truck Frame Mounting. 36"x18" B. B. Channel Conveyor and belting 30"x50" B. B. 8" channel conveyor with chutes, drives, hoppers, walkway, guards and bracing. Located South Dakota.—Ref. 9804.
- One (1) Primary Cedar Rapids Bronze Bearing Crusher 15x30, mounted on low slung factory built steel wheel chassis. Guaranteed. Located Minnesota.—Ref. 9805.
- Two (2) No. 6 Champion Jaw Crusher (manganese fitted). Located near New York City.—Ref. 9806.
- One (1) 12x24 Champion Jaw Crusher—good working order. Located in Pennsylvania.—Ref. 9807.
- One (1) 10x24 Diamond Roll Crusher—rubber mounting. Good condition. Located Wisconsin.—Ref. 9808.
- One (1) 15x36 Diamond Crusher—roller bearings are good—rollers are 18x42—150 HP Cummins Diesel Engine—tandem roll and completely mounted with 9.20 tires—also self propelling—about 90 tons per hour capacity—rollers made by Wisconsin Foundry Co. Weight about 35 tons. Used only two seasons. Located Wisconsin.—Ref. 9809.
- One (1) 15x50 Type B. Farrell Jaw Crusher—this machine is in A-1 condition—overhauled thoroughly about 1 1/2 yrs. ago and since then has been used on one airport job. The manganese dies plates are worn on one end only. Located in New England.—Ref. 9810.
- Two (2) 13x30 Farrell Jaw Crushers, new bearings, good condition. Located in Pennsylvania.—Ref. 9811.

- One (1) 18x36 Farrell Jaw Crusher, new bearings, manganese jaws, very good condition. Located in Pennsylvania.—Ref. 9812.
- One (1) 24x36 Farrell Jaw Crusher, 14B, new bronze bearings, manganese jaws. In first-class condition. Located in Pennsylvania.—Ref. 9813.
- One (1) No. 6 Gates Gyrotory Crusher, good concaves, eccentric, gears, pinions and drives. In good condition. Located on West Coast.—Ref. 9814.
- Five (5) No. 6 Gates—L Gyrotory Crushers with feed openings—2 approximately 18"x68"—some of them have all cast steel frames—two of them cast iron frames—rated capacity 250 TPH when crushing 5 1/2" product—rated when crushing dry hard limestone—weight about 110,000 lbs. each. These machines will be fitted with manganese steel crushing parts. Located Alabama.—Ref. 9815.
- Two (2) No. 6K Gates Crushers—located New York.—Ref. 9816.
- One (1) 7 1/2 D Gates Gyrotory Crusher—42"x20" Pulley drive, including timber feed hopper. Located in Ohio.—Ref. 9817.
- One (1) Gates Gyrotory Crusher—Serial number in 1100s—has chilled iron liners. Capacity 70 tons per hour. Located Ohio.—Ref. 9818.
- One (1) 11"x22" Jaw Crusher—Good Roads make. Located in Illinois.—Ref. 9819.
- One (1) No. 10-30 Good Roads Crusher—1932—serial number in Y-150s. 4 roller bearings need replacing to put the unit in perfect shape. Located Up-State New York.—Ref. 9820.
- One (1) 1030 Good Roads R/B Crusher in excellent condition. Located in Tennessee.—Ref. 9821.
- One (1) 10x30 Goodman Roller bearing portable crushing plant. Located in Wisconsin.—Ref. 9822.
- One (1) Colorado Iron Works 30"x10" improved standard crushing roll—cast steel rolls—spring tension—steel enclosed—belt drive with 24"x9" and 48"x12" wood pulleys—incl. One standard belt drive eccentric motion feeder—belt drive and countershaft. Located in Ohio.—Ref. 9823.
- One (1) No. 5 Kennedy Gearless Crusher—new mantle and lower concaves of manganese steel. Located in Florida.—Ref. 9824.
- One (1) Kennedy Ball Bearing Gearless Gyrotory Crusher, No. 25 Type "S." Openings in crusher (two each) 5 1/2"x19"—capacity per hr. in tons of 2,000 lbs. passing 3/4" stone—30 tons per hr. Driving pulley 41 1/2"x25". 400 RPM. Weight about 20,000 lbs. In good condition and has been operated for only a short time. Located in Mississippi.—Ref. 9825.

- One (1) No. 37 Kennedy Reduction Crusher, serial number in 4020s—good working order. Located in Pennsylvania.—Ref. 9826.
- One (1) No. 37 Kennedy Reduction Crusher, Type S, with springs for tramp iron release, serial number in 1290s—first-class condition. Located in Pennsylvania.—Ref. 9827.
- One (1) Pennsylvania Roll Crusher No. 728—24x30". Located in Michigan.—Ref. 9828.
- One (1) Pioneer No. 12 Duplex Crushing outfit. Serial number 12B14. Located in Minnesota. Sales condition guaranteed.—Ref. 9829.
- One (1) 10x20 Reliance Jaw Crusher, in good condition. Located in Pennsylvania.—Ref. 9830.
- One (1) 20x26 Roll Crusher, new brass bearings, smooth shells, belt drive. Located in Pennsylvania.—Ref. 9831.
- One (1) Startevant Open Door Rotary Crusher ready to operate. Located in Pennsylvania.—Ref. 9832.
- One (1) 13-B Telamith Gyrotory Crusher, serial number in 1100s, in first class condition. Located in Pennsylvania.—Ref. 9833.
- One (1) No. 8—16" Traylor Gyrotory Crusher—located around New York.—Ref. 9834.
- One (1) Universal Bronze Bearing Jaw Crusher 9x36, serial number in 5660s—located Minnesota.—Ref. 9835.
- One (1) Crusher—this machine was babitted all over, with new flanges—rocker pine, timber roller, brasses, etc. This crusher is complete with the exception of one 6" 4 ply 30" belt. The outfit consists of No. 4 Crusher (Champion) power unit (Busch, conveyor and belt, roller, etc., 12' 32" revolving screen, 3 sections (deck 1/2" to 1" rings—1" to 1 1/2"—1 1/2" to 3"—1,500 gal. water tank used for radiator. Located Georgia.—Ref. 9836.
- One (1) Stone Crusher (new jaws) complete with elevator, screens and bins. In good condition. Located New York State.—Ref. 9837.
- One (1) Gates No. 6 Gyrotory Crusher, Serial number in 1100s—has chilled iron liners, capacity 70 tons per hr. Located in Ohio.—Ref. 9838.

PLANTS

CRUSHING—Sand and Gravel

- One (1) Pioneer 8x24 plant complete with conveyors, feeder, hopper, mounted on steel wheels. Rebuilt. Located in Wisconsin.—Ref. 9839.
- One (1) 9x36 Pioneer Crushing Plant, complete, with 6 cyl. Lacey power plant, gasoline, mounted on steel wheels. Located in Wisconsin.—Ref. 9840.
- One (1) 9x36 Pioneer Crushing plant, mounted on rubbers, complete with conveyors, feeder, hopper; rebuilt. Located in Wisconsin.—Ref. 9841.
- One (1) Pioneer 9x36 portable crushing plant—solid tires—15-30 International motor. Located in Wisconsin.—Ref. 9842.
- One (1) Portable Crushing plant—No. 4 crusher—conveyor, power unit—110"—air compressor. A complete outfit. Located in Georgia. (8-2562)—Ref. 9843.
- One (1) Completely assembled crushing plant with Linkbelt, self-aligning roller bearing block—220"24" belt running 100-120 yds. per hour, powered by 120 HP 32E12 2 cylinder 12x15 bore and stroke Fairbanks-Morse full diesel motor together with all accessories, belt pulleys, pumps, all set up and now running, together with 3 roller crushers and 3 screens—final screen Tyler Niagara Type 300 4x8. Located in Florida.—Ref. 9844.

ECONOMY COMPANY, INC.

NEW YORK 40

DRAGLINES SHOVELS CRANES AND OTHER ROCK PRODUCTS EQUIPMENT

One (1) Complete Crushing plant, capacity 50-75 tons per hr. consisting of the following:
1—24"x30" Roll Crusher, New Holland.
1—50 HP Motor (3 slip ring) complete with control.

1—10"x30" Wheeling Roller Bearing Jaw Crusher.
1—35 HP Motor with starter.
1—4"x6" Triple Deck Seco Gyrotory Screen.
1—15 HP Motor.
1—V Belt to Screen.
1—105 Blaw Knox, 3 compartment Bin (Steel with Gates Collecting Hopper) Steel Flow 10' above bin with all necessary supports.

Other accessories. (Full description furnished on request.)—Ref. 9845.

One (1) Complete Crushing Plant, capacity 50-75 tons per hr. (Full details furnished upon request.) Located in Ohio.—Ref. 9846.

One (1) Complete Gravel, Crushing, Screening and Washing Plant. All steel, semi-portable. Consists of:

1—Northwest Crawler Crane, Model 105, powered with Twin City gasoline engine.
1—Telsmith Gyrotory Crusher, Model 8B.
2—Butler Steel Bins with weighing hoppers.
1—Bucket Elevator.
1—4"x8" Telsmith Vibrator.
1—Telsmith Revolving Screen 48"x261.
3—24" Belt Conveyors.
1—Single Action Feeder.
1—Waukesha Gasoline Engine, Industrial Unit, 125 HP.
1—Gould Centrifugal powered with 75 HP Wisconsin Engine.

This plant is assembled on all steel beams and is so constructed as to be disassembled in units of six tons each. Located in Wisconsin. (S-1048).—Ref. 9847.

One (1) Plant 0 1 hoist, ½ yd. bucket with draglines, 1 large tractor, one electric pump that will pump 200 gal. a minute. Equipment in good or fair condition, also stone Crusher. Located Indiana.—Ref. 9848.

One (1) Limestone Plant—Entire Plant. (Further details on request. Located in Ohio. (S-1304).—Ref. 9849.

One (1) Sand Plant—consisting of 1 60' Belt Conveyor Electric Motor—1 Gyrotary Screen—electric motor—1 Bucket Elevator—1 Jaw Crusher—1 2-Drum Hoist. In perfect condition. Located in Michigan.—Ref. 9850.

One (1) Complete Sand Plant electrically operated—One (1) Complete Sand Plant diesel powered—Both about two years old and in excellent condition. Located in Okla. (S-1237).—Ref. 9851.

One (1) Portable Sand and Gravel Plant—Cedar Rapids—Serial number in 3420s. This unit includes screens, conveyors, bucket loaders, etc., is completely equipped. Has had little use. Located in Vermont.—Ref. 9852.

One (1) Portable Gravel Plant—Cedar Rapids Feeder and Jaw Crusher 9x24. Secondary: Pioneer Roll. Simplicity three-deck vibrating screen. Twin City gas engine for power. This plant has turned out 600 yds. a day regularly. Is in excellent condition—mounted on hard rubber tandem wheels. Located in Michigan.—Ref. 9853.

SCREENS

One (1) 36"x16" Acme Revolving Screen—in good condition—ready to operate. Located in Pennsylvania.—Ref. 9854.

One (1) 42"x14" Acme Revolving Screen—in good condition—ready to operate. Located in Pennsylvania.—Ref. 9855.

Three (3) 48"x20" Allis Chalmers Extra Heavy, closed end, fully enclosed Revolving Screens, complete with Tex-Rope Drives and 25 HP motors. Located New York State.—Ref. 9856.

One (1) Sand and Gravel Revolving Screen (P. S. Converse Co.). Is 5' in length, 3' in diameter and is made of wire with ½" opening and 14 gauge wire. It operates with a No. 395 gasoline engine, Type V-300 one cylinder, probably 1 HP, made by Louisa Co. Is constructed on a steel angle frame and is driven by the small engine through a belt-drive to a large pulley and then by a chain and sprocket gear to the screen. Is in good condition. Located in Brooklyn, N. Y.—Ref. 9857.

One (1) 40"x10" Diamond Revolving Screen with drive and 3 sets of scalping screens. Located in Iowa. This equipment has been well maintained and is in good operating condition.—Ref. 9858.

One (1) Diamond Scrubber Screen (3 size aggregate), 40"x18", weight 8665 lbs. Sand drag and tank—about 250' 0" pipe. Located Wyoming.—Ref. 9859.

One (1) 40"x16" Diamond Revolving Screen with 3' scrubber sections, 2 sections 4'0" with ½" plate screens and 9' of 4'10" Sand Jacket. Located in Iowa. This equipment has been well maintained and is in good operating condition.—Ref. 9860.

One (1) Double Deck Screen. Located in Illinois.—Ref. 9861.

One (1) Electric Jigger Screen (coal), 100"x42" wide, for all sizes of coal from stoker to 4" egg coal. In excellent condition with motor included. Located in Pennsylvania.—Ref. 9862.

Two (2) Exolon Multiform Grader Screen. Four decks with 34"x27½" screening surface, including feed hopper drive mechanism and motor. Length 6'8", width 4'4", height 5'. Approx. weight 1000 lbs. These screens used for accurate sizing work. Located Up-State New York.—Ref. 9863.

Two (2) Type 32 Hummer Screens 3'x5' double deck. Equipped with fine hoppers, balance gate feeders, dust covers, and independent stretching arrangement. Each complete with V-16 vibrator—serial numbers in 7560s and 7240s. Body serial numbers in 7450s and 7580s. These screens purchased in 1937 and used only a few months. No generators with screens but new Thermionic power units can be purchased to operate these screens, which are much cheaper than generator equipment. Located Up-State New York.—Ref. 9864.

One (1) 5'x10' Niagara Single Deck Screen with 5 HP motor and V-belt drive. Rebuilt. Located in Pennsylvania.—Ref. 9865.

One (1) 5'x24' Traylor Heavy Duty Revolving Screen—in good working condition. Located in Pennsylvania.—Ref. 9866.

One (1) 5'x24' Traylor Trunnion Drive Revolving Screen, complete with screen sections and motor. Located in Reading, Pa.—Ref. 9867.

One (1) Traylor Revolving Screen—5' dia. x 25' long revolving stone screen—open end type—bevel geared drive—66"x12" pulley—8'—5' dia. 1" rod 60°; 4'—5' dia. ½" rod 3° mesh—8'—5' dia. ½" steel perforated, ¾" holes—4'5" dia. ½" steel perforated, ¾" holes—10' 7'2" dia. 1½" mesh—No. 6 wire—incl. countershaft, timber framing, sidings, partitions and guard. Located in Ohio.—Ref. 9868.

One (1) 5'x26' Traylor Heavy Duty Revolving Screen, extra heavy for real heavy work, a lot of screen sections, positive drive, in first-class condition. Located in Pennsylvania.—Ref. 9869.

One (1) Revolving Screen 21' long 42" dia. with sections. Located in Florida.—Ref. 9870.

BINS

One (1) 2 compartment all steel Johnson Batch- ing Bin (no scales or batcher). Located South Dakota.—Ref. 9871.

Five (5) Link Belt steel bin or hopper gates with handles. Further details on request. Located Up-State New York.—Ref. 9872.

Three (3) 36"x36 Standard Type Moore Bin Gates. In splendid condition in every respect—have had only about 2½ years actual service. The gates are also equipped with 30" hand wheels. The operating shaft is extended on both sides of the gate so that it is possible to open the gate from either side. Located in California.—Ref. 9873.

Two (2) 30"x30 Standard Type Moore Bin Gates. In very good shape with the exception of some small torn spots in the rubber belt of the gate mechanism. Located in California.—Ref. 9874.

One (1) Pioneer Loading Bin—Model 5 C.Y. Sales condition guaranteed. Located in Illinois.—Ref. 9875.

One (1) 3x8 Telsmith Two Deck Vibrator with 5 HP ball bearing fully enclosed motor and a lot of screen sections—like new. Located in Pennsylvania.—Ref. 9876.

One (1) 6x10 Niagara Two Deck Vibrator with 10 HP motor and V-belt drive. Rebuilt. Located in Pennsylvania.—Ref. 9877.

One (1) 4'x5' Link Belt Vibrator with bin for rescreening from stockpile. Located in Pennsylvania.—Ref. 9878.

One (1) 5x10 Niagara Two Deck Vibrator with 10 HP motor and V-belt drive—rebuild. Located in Pennsylvania.—Ref. 9879.

One (1) 4x6 Telsmith Two Deck Vibrator with 7½ HP ball bearing fully enclosed motor and V-belt drive and a lot of screen sections. Like new. Located in Pennsylvania.—Ref. 9880.

One (1) Master Vibrator Type E Model 23—serial number in 8490s—24' casing. Located in Texas.—Ref. 9881.

One (1) Mall Vibrator Type 15070-D—serial number in 8320s—18' casing. Located in Texas.—Ref. 9882.

One (1) V-75 Syntrol Electric Vibrator complete with V.C.R. controller; 220 volt 60 cycle. Complete with one set of male and female dovetail earings. Located Up-State New York.—Ref. 9883.

Two (2) Vibrating Feed Spreaders No. 2, 30"x6"—complete with various all suitable for operation on 110 volt 60 cycle A.C. current. Serial numbers in 3870s. Located Up-State New York.—Ref. 9884.

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One (1) Hetherington & Berner Sand and Gravel Pumps, 8", 50-60 HP Red Wing Marine Motor. Located Ohio.—Ref. 9885.

One (1) 3-B Ajax Shaker Shaker. Serial number in 950s. Located Up-State New York.—Ref. 9886.

Two (2) 6-B Ajax Shaker Shakers. Serial numbers in 1130s and 870s. Located Up-State New York.—Ref. 9887.

One (1) Howe 6-ton 18x9 Wagon Scale with grain beam. Located in Missouri.—Ref. 9888.

One (1) 80-Weigh 15 ton 18x9 scale with grain beam. Located in Missouri.—Ref. 9889.

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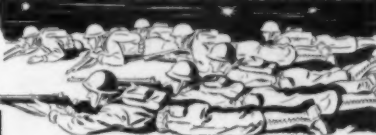
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Haiss creeper loader. Capacity, 2 to 3 yards per minute.

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GOOD VALUES—ALWAYS

30 Ton Plymouth Diesel Locomotive.
24x18" American Hammermill Pulverizer.
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Caterpillar "85" Diesel Tractor & Bulldozer.
80 HP. & 150 HP. 125 lb. Steam Boilers.
26 yd. Electric Crawler Dragline, 180' boom.
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1. One Austin Western 9-40 Roller Bearing Crusher, complete with Elevator and Revolving Screen.
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One Besser Super Tamper including attachments to make five different size blocks, this machine was purchased new in 1940. Price \$8,000.00. For information write Box B-69, c/o Rock Products, 309 W. Jackson Blvd., Chicago, Ill.

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1 BUCYRUS-ERIE ROCK GRAB
NEW—NEVER USED
CAPACITY—5 TONS
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Second hand Allis-Chalmers Ball Mill, Williams Hammer Mill, Link-Belt Elevators and Conveyor. Roller bearing end dump mine pit cars. Link-Belt Coal Crusher. Storage bins. Marion Steam Dragline at phosphate plant 55 miles from Nashville, Tennessee. Thomson Phosphate Company, 497 South Dearborn Street, Chicago 5, Illinois.

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Buc. Erie 50B, 2 yd. Stripping Shovel, steam.
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Allis-Chalmers L Tractor with Baker bulldozer.
5-Eucild Trac-Trucks, Diesel 9 yd.
Bucket Elevator, vertical, 40', 24' buckets.
I.R. two stage, 315 CFM, Portable Compressor.
6-I.R. Wagon Drills.
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2-Steel Stiff-Leg Derricks, 10 tons, 100' bin.
Hardinge Conical Ball Mill, 4 1/2'x10'.
Allis-Chalmers Cent. Pump, electric, 3500 GPM.
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Dredge Pump 10' F.H. cent., nearly new.

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Fuse*

Manufacturers of Safety Fuse since 1836

THE ENSIGN-BICKFORD COMPANY • SIMSBURY, CONNECTICUT



ON LAND

OR SEA

IN THE AIR

IN INDUSTRY

it's

TRU-LAY

Preformed Wire Rope

Whether at the jobs of war or in war production, American Cable **TRU-LAY** Preformed Wire Rope ranks as the preferred line. That's because it handles easier, reeves faster, lasts longer.

It is the preforming process that endows **TRU-LAY** with high fatigue resistance. Being more flexible than non-preformed, **TRU-LAY** bends easily, resists kinking and whipping, spools better. The preforming process sets new and higher standards for wire rope service, and **TRU-LAY** is the original preformed wire rope. Be sure your next line is **TRU-LAY** Preformed made by American Cable.

AMERICAN CABLE DIVISION

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma

AMERICAN CHAIN & CABLE COMPANY, Inc.

BRIDGEPORT • CONNECTICUT



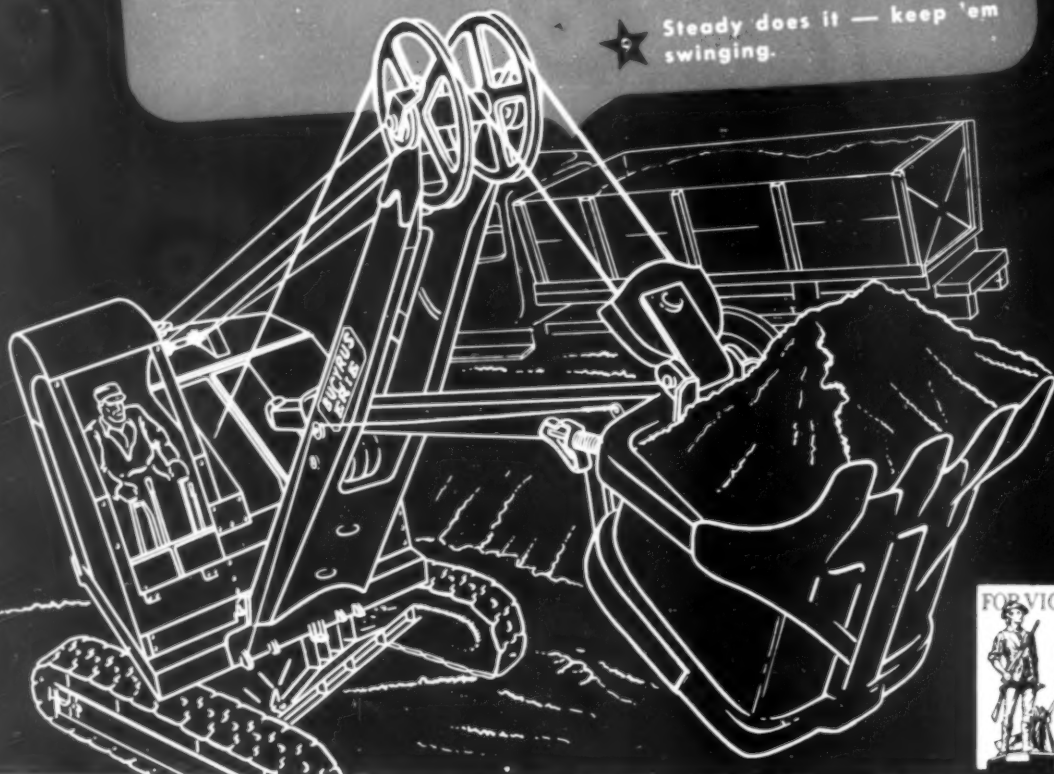
ESSENTIAL PRODUCTS...TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, MANLEY Auto Service Equipment, MARYLAND Bolts and Nuts, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Steel Castings, WRIGHT Hoists, Cranes . . . *In Business for Your Safety*

SWING IT *for* VICTORY

The output of any shovel depends on the operator's "know how." Check your shovel performance with the list below and perhaps you'll find a point or two that will help. We all want to win this war the quick way . . . let's go!

- ★ 1 Keep the swing short . . . spot trucks in close.
- ★ 2 Cut a thin slice up along face so the dipper comes up fast and easy. Don't overcrowd!
- ★ 3 Keep dipper teeth sharp.
- ★ 4 Set pitch braces for fast digging. Angle of teeth should usually match average angle of bank.

- ★ 5 Keep your friction clutches right. You can't dig fast with a sloppy clutch adjustment.
- ★ 6 Loosen the bank while you wait for trucks.
- ★ 7 Overlap your cycle . . . have dipper at right height for dumping when it swings over truck; swing and lower; come in crowding.
- ★ 8 Move up often, work your bank close.
- ★ 9 Steady does it — keep 'em swinging.



Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

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